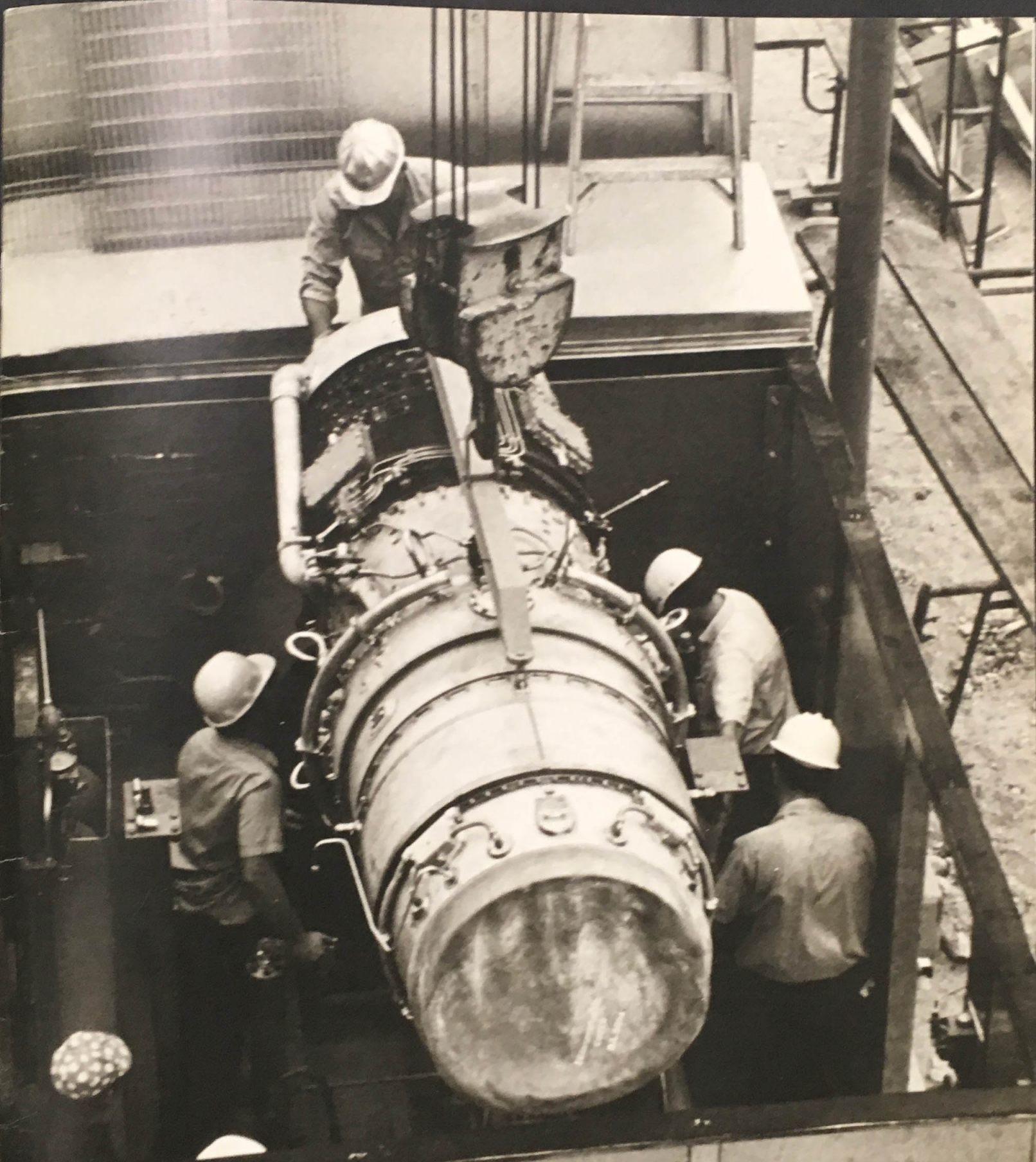


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EL PASO COMPANY AND SUBSIDIARIES FEBRUARY 1977



◁ VIEW FROM the crane can be exhilarating, as Cliff Trussell discovered on a recent photographic visit to Algeria to picture construction of the LNG liquefaction plant at Bethioua near Arzew. Top left, and continuing clockwise, the lift begins, he's almost there, view from bottom to top and from top to bottom (100 meters).

On The Cover

WOULDN'T SAY QUIT attitude on the part of an engineering group at El Paso Products' Butadiene Plant, resulted in considerable savings in fuel and maintenance costs with the installation of jet engines used to regenerate catalyst. Story beginning on page 9 gives some of the details involved in this installation.



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The Silent Killer Stalks Us All

W. E. "BILL" WINFIELD is 53 years old. Four years ago he suffered his first heart attack.

"I was working the night shift at Leupp Compressor Station. There were other men in the plant, but I was alone in the control room," he recalled. I'd been having discomfort all evening,

but I figured it was just indigestion.

"Suddenly, pains were shooting down both my arms. It was so bad, I wanted to pull my arms off. I got to the phone and called Hugh Graves, who was the supervisor. He came right over, put me on oxygen and took me to the hospital where I was in intensive care for three days."

Seven months later Bill had another attack. This time he was out of work for three months. Surgery was suggested, but Bill chose to curtail some of his activity and rely on medication.

"It's a frightening thing to think of having heart surgery," he said. "You hear all kinds of wild stories — or at least, I did."

HUGH F. STEEN HEADS HOUSTON HEART DRIVE

Hugh F. Steen, president of the El Paso Company, has accepted the chairmanship for the 1977 Heart Fund campaign in Houston. The

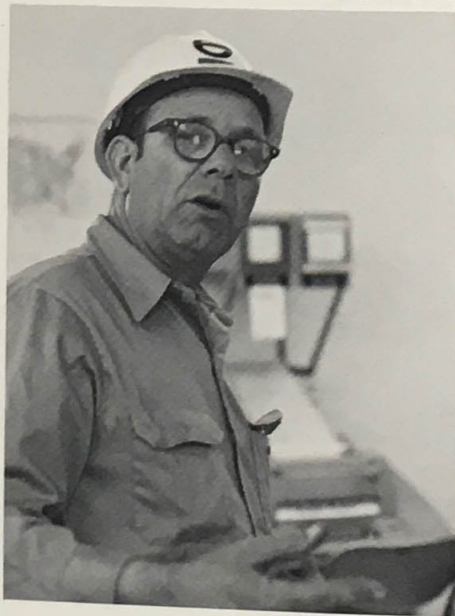


Heart Drive is annually held during the month of February.

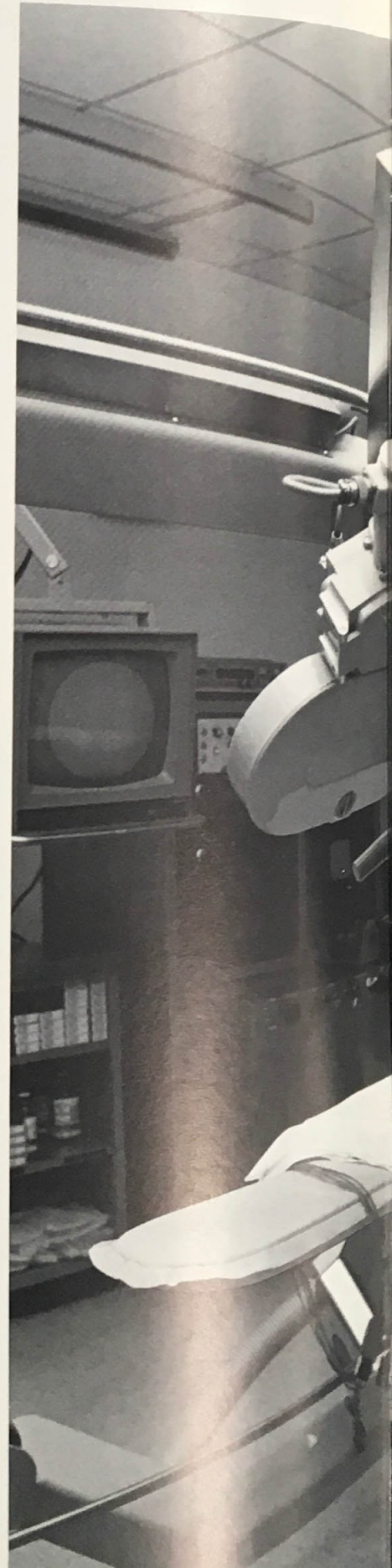
As head of the Houston campaign, Mr. Steen will coordinate the efforts of 20,000 community volunteers who will visit business and residential areas to distribute heart-saving information and collect funds to support research, educational programs, and community service projects sponsored by the American Heart Association, Houston Chapter.

In accepting the appointment, Mr. Steen noted that heart disease is the number one killer in the United States. He said that "close to a million Americans will die from some form of cardiovascular disease this year or about the same number of people in a city the size of Houston."

Bill Winfield



*"You're sitting on a
keg of dynamite, Bill."*





"But when I began having more pains, I knew that surgery was necessary. So I went to Good Samaritan Hospital in Phoenix for tests."

One of the tests taken by Dr. Alberto Benchimol, head of the Cardiac Institute at Good Sam Hospital, was cardiac catheterization. A thin, flexible tube was inserted into an artery and guided to the heart. During this test, a special fluid is released, which shows up on X-ray, and a series of X-ray pictures traces the flow of the liquid, visualizing the internal condition of the heart and arteries on a TV monitor.

"The TV screen was set up where I could see it," Bill said. "After two days of tests, I was discharged. But before I even reached home, the doctor called."

"When I returned his call, he said, 'You're sitting on a keg of dynamite, Bill. The fuse isn't lit yet, but I suggest you turn around and come back in for surgery.'"

In February 1974, Bill was admitted for heart surgery which was performed by Dr. Lee Brown. Eleven days later he was back home. In six weeks he was back at work. Today he is chief plant maintenance mechanic at Leupp Station in Arizona.

Bill Winfield is one of a growing number of people who've had their



HEART ATTACK victim Howard Duscha, Systems & Computer Services in El Paso, is filled in on exactly what happened during the attack by Gary Tague, St. Joseph's Rehabilitation Center. The machine (left), used in cardiac catheterization tests, transmits a picture of the conditions existing inside the heart and coronary arteries to the television screen.

lives saved by medical advances in treating Cardiovascular Diseases (CVD). These advances have been made in just the past couple of decades. In spite of tremendous strides forward, however, heart disease still ranks as the number one killer in the U.S.

Many thousands of these deaths occur among people in their most productive years. CVD strikes men and women in responsible jobs at a time when they still have children in school and mortgage and car payments to make.

CVD has risen to tragic prominence when many Americans are enjoying prosperity and its accompanying "good life." The American Heart Association estimates that heart and vascular diseases cost some \$22.7 billion annually, and that nearly 29 million Americans have some form of heart and/or blood vessel disease.

It is a fact that 684,066 deaths in 1973 were due to heart attack and it is estimated that at least the same number of persons died in 1976 from the same cause.

It is also a fact that some people are suffering one or more symptoms of CVD and are unaware of it.

Henry Dundas is tall and thin; a patient man with a slow, warm smile. He is, and always has been, interested in sports and the outdoors. Golf, tennis and camping with his active family were among his favorite activities.

His job as coordinator for the Southern Division of El Paso Natural Gas Company was a satisfying one.

"For about a year I felt bad," he recalled. "I tired easily and was short of breath. But I never had any pain.

"It was either continue as an invalid or have the operation."

"Then I came down with what I thought was the flu. It dragged on for nearly three months. Then I began experiencing pain on both sides of my throat and up under my jaws.

"I felt so rotten one day that I decided to see the Company doctor. He suspected heart trouble immediately, and scheduled a stress test for me. It only took 30 seconds on that treadmill to confirm his suspicions."

Within 24 hours of having an angiogram test, Henry was in Houston, in surgery. Using sections of the saphenous vein removed from Henry's leg, the cardiac surgical team implanted

"You don't have to have a heart attack before you undergo heart surgery."

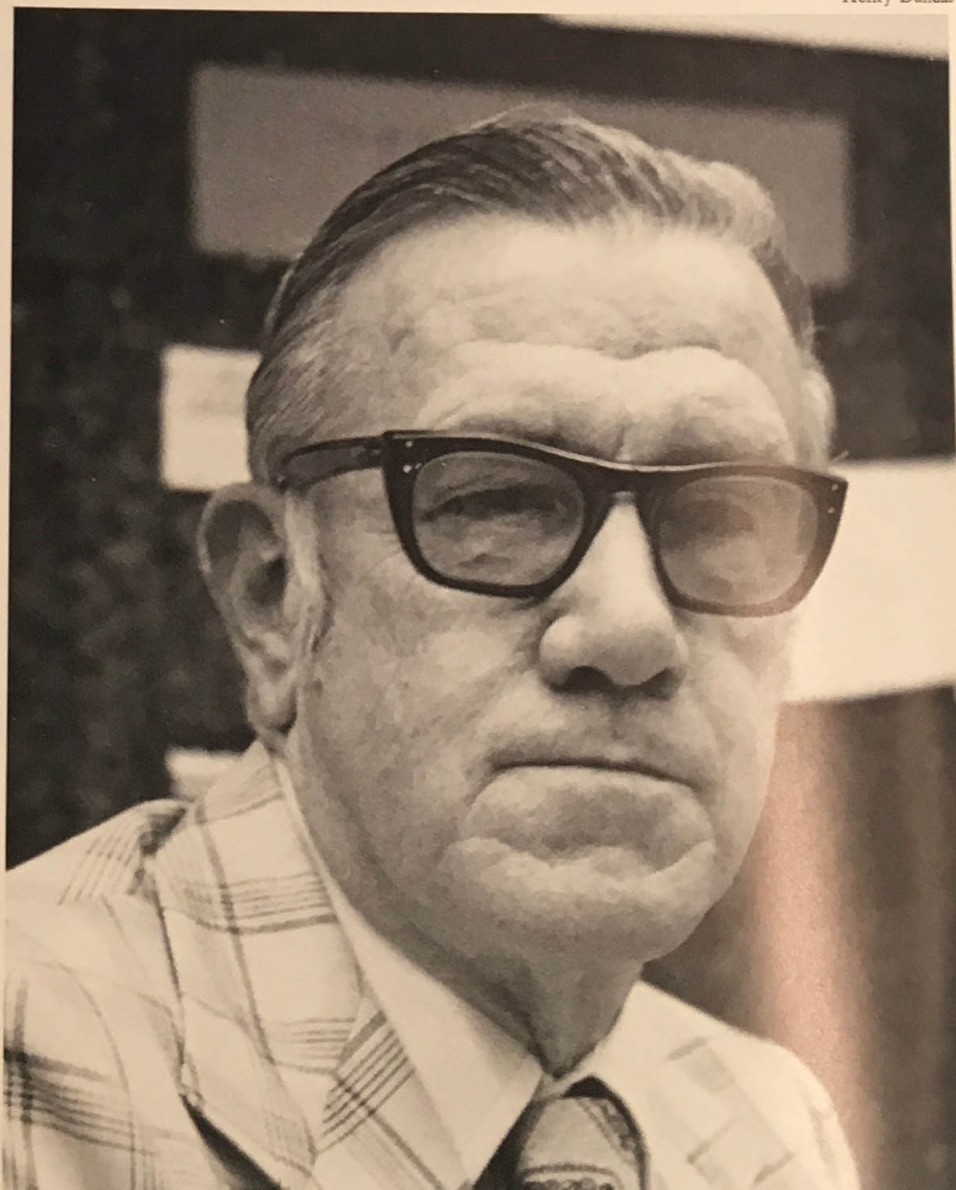
four bypasses from the aorta to the heart to replace the occluded, or blocked, arteries.

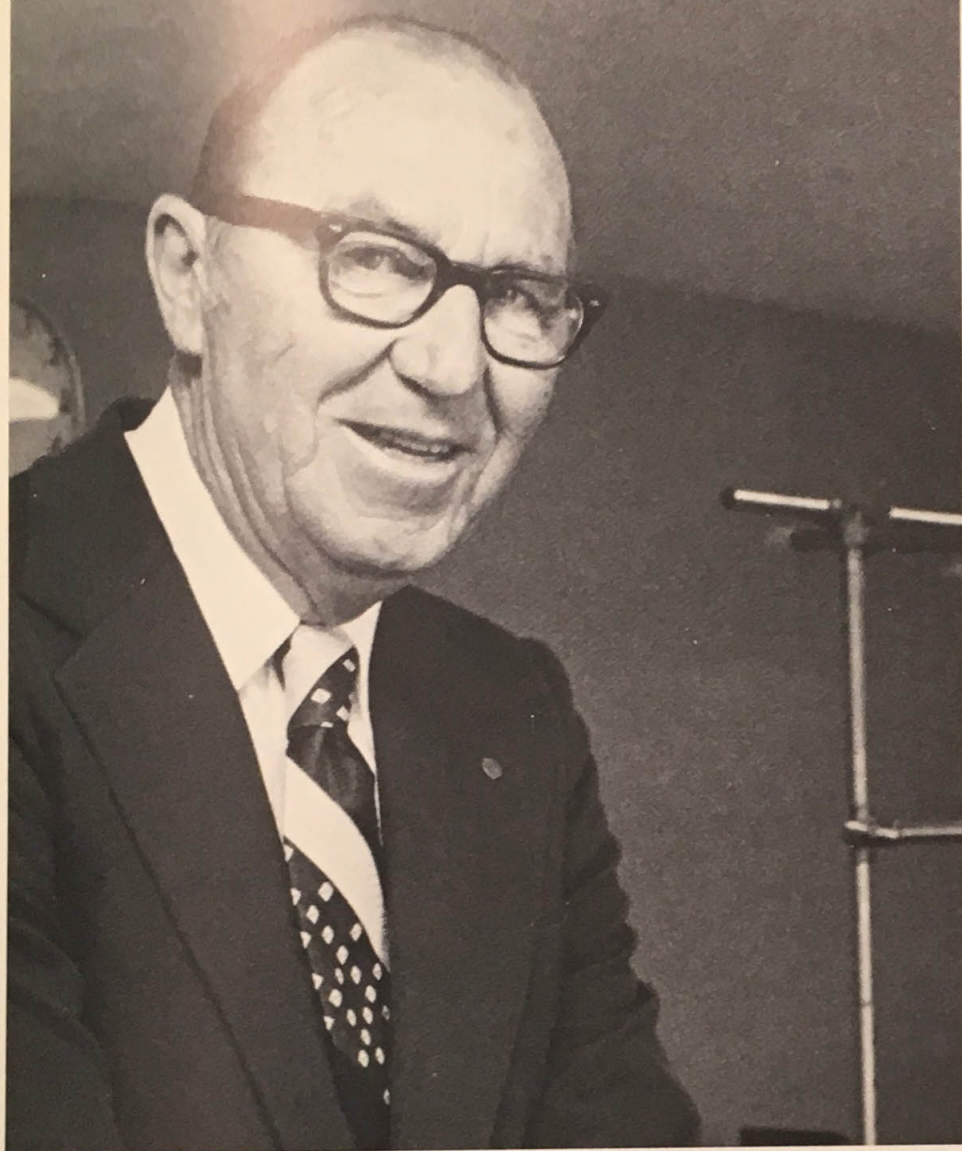
During surgery Henry suffered his first cardiac infarction — heart attack.

"I didn't know anything about it, of course," he said, "until after I awakened from the anesthetic. I spent 12 days in the hospital, recovering."

The day after he returned home to complete his recuperation, Henry had his second heart attack. Seven months later, in September 1975, he repeated his visit to surgery.

Henry Dundas





Bud Lassiter

"This time the surgery was performed in El Paso," he said. "I was a little more apprehensive than I was the first time, but I'm a realist. It was either continue as an invalid, or have the operation."

Neither Henry nor Bill was what most people consider prime heart attack candidates. Both were physically active; neither was overweight.

The Heart Association says that a man's chances of having a heart attack before age 65 are between one in twenty and one in fifty, IF he has normal weight, normal blood pressure, average or low levels of blood cholesterol, no diabetes, is not a heavy cigarette smoker, is moderately active, has a normal cardiogram, and has no damage to his kidneys or thyroid gland.

The heart is the sturdiest, toughest muscle in the body, and was designed to carry on its vital activity day in, day

out, year in and year out, without conscious effort.

But modern living conspires to interfere with its precise, dependable activity. Cigarette smoking, high blood pressure, lack of exercise, hereditary factors, improper eating habits, and tensions and stresses cause a kind of biological rust in the coronary arteries which supply life-sustaining blood to the heart itself.

This condition is known as arteriosclerosis. Deposits of fatty material and calcium called "plaque" narrow the arteries and roughen their normally smooth lining. These plaques cause cells in the artery walls to break down, irritating tissues and causing scars. Over a 20- to 30-year period, plaque build-up reduces the heart's blood supply causing a pain known as "angina pectoris."

"You don't have to have a heart attack before you undergo heart sur-

gery," explained N. D. "Bud" Lassiter Jr., employment administrator for El Paso Natural Gas Company.

"I had suffered from angina pectoris for about three and a half years," he said. "I thought maybe it was indigestion or a hiatal hernia, since I didn't have a history of high blood pressure and my cholesterol levels were normal.

"But any increased or sudden activity produced pain. So I began to live within a narrowing activity range, and I made sure I had nitroglycerin tablets with me at all times."

Eventually, Bud took a stress test, and then had an angiogram. The tests showed that two coronary arteries were blocked—one 70 percent and the other 90 percent.

"I was given certain options," Bud related. "With surgery before a heart attack, I could be assured of a 98 percent complete recovery chance. Without surgery, there was a 50/50 chance that I would have a major heart attack within six to eighteen months, with a 50/50 chance of survival. If I survived and then had surgery, recovery chances dropped to 60-70 percent.

"There seems to be this one thing in common with heart doctors," Bud said, "they're anxious for you to understand completely what your situation is. They explain everything in detail as many times as necessary in



PATIENT'S PROGRESS can be monitored at this location, no matter where patient is in the Cardiac Care Unit ward. At left is Mrs. Evelyn Baggins, director of nursing, and Sandy Earles, head nurse.

order for you to have a complete picture of what is taking place—or about to take place. I've found them to be totally honest with the patient."

Bud underwent surgery in January 1975. About six weeks later he was back at work. He is not restricted in his activities, and does not have to adhere to a special diet.

"I am conscious of the importance of regular exercise," he said, "and also of eating properly. And I don't smoke. I know for sure that recovery is enhanced if you have surgery before your first heart attack."

Dr. Alejandro Duran Jr., on the staff of St. Joseph Hospital's Cardiac Rehabilitation Center in El Paso, Texas explained that there are four major precipitating factors for heart attacks. They are: stress, elevated blood pressure, elevated serum cholesterol (dietary or metabolic), and smoking one or more packages of cigarettes a day.

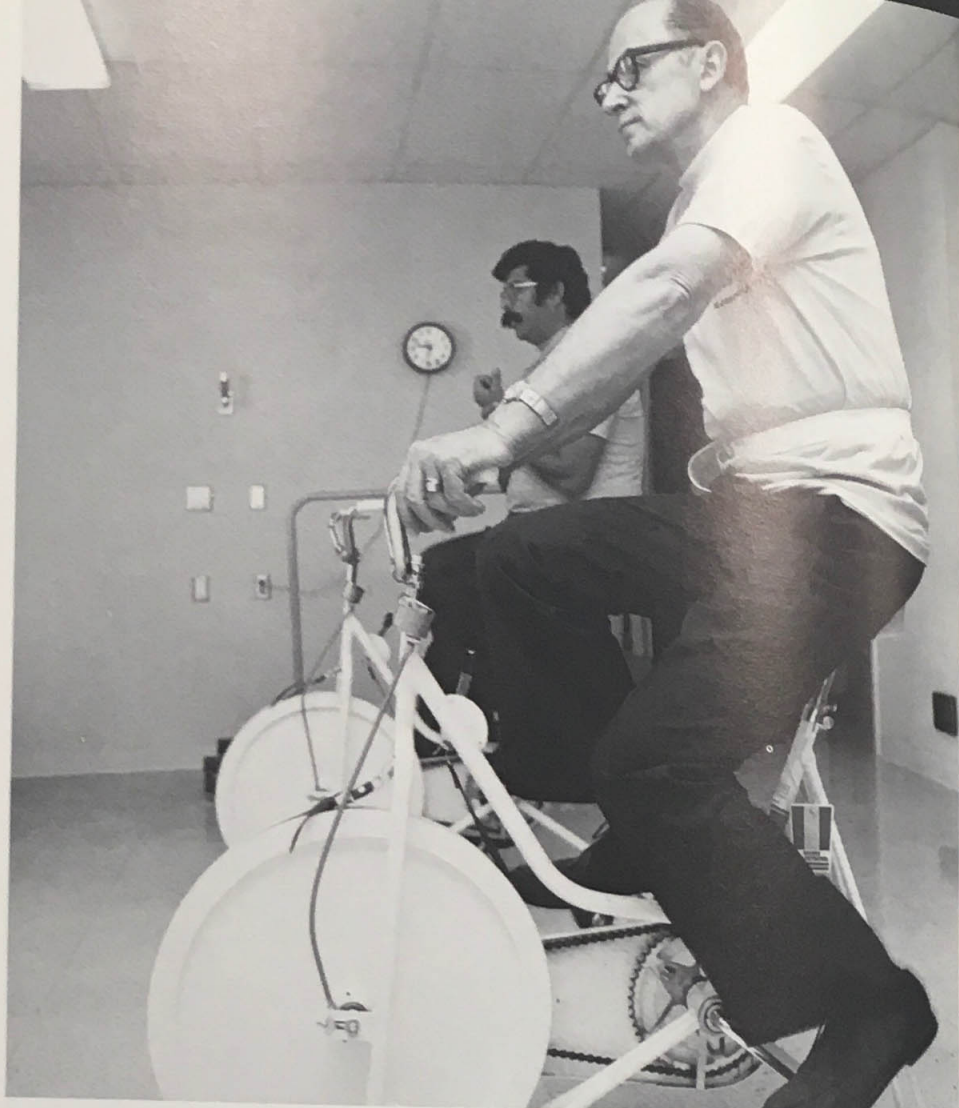
Nearly everyone is familiar with the dangers of the last three factors. But in recent years, more attention has been paid to the eventual price that more-than-normal amounts of stress exact.

"Man was designed to live in an unstressed state," Dr. Duran said. "That means being happy and living in harmony with one's environment."

"If you have to face stress on a daily basis, your body goes into an emergency or lifesaving reaction. It's actually a 'fight or flight' type of reaction



DR. ALEJANDRO DURAN feels man was designed to live in an unstressed state.



HOWARD DUSCHA pedals to a clock during his first day's exercise period. A

monitor on his belt relays information concerning his heart rate to a technician.

where adrenalin is released into your system, triggering the following body reactions:

1. Rapid heartbeat (tachycardia).
2. Increased visual acuity.
3. Increased blood circulation to the brain. (These three reactions are the reason you function better under stress).
4. Increased circulation to arms and legs (for flight or fight).
5. Less circulation to the gut.
6. Increased muscle tone in abdominal muscles.
7. Increased secretion of hydrochloric acid to stomach (resulting in abdominal pain or spasms, or peptic ulcer disease).
8. Elevated blood pressure.
9. Elevation of serum cholesterol.

"These reactions were meant to literally save your life in occasional emergency situations, not to be used on a daily basis," he said.

The emotions that trigger the adren-

alin — or stress — reaction are fear, anger, hate, resentment, unforgiveness, fatigue (either physical or mental), or mental depression. And few can argue the fact that nearly everyone faces these stresses daily.

"There's one other bit of bad news that stress causes," Dr. Duran said. "Overproduction of adrenalin gives the heart an irregular rhythm which, if it continues for just four consecutive heartbeats, will be fatal within four minutes if it is not stopped."

"We're all familiar with such incidents. A person becomes enraged over some situation, and dies within minutes. The sudden flood of adrenalin to the heart caused an irritable heart rhythm called premature ventricular contractions, with fatal consequences."

Stressful incidents may cause different reactions in certain individuals, however. Research efforts have uncovered the fact that many diseases are the result of stress. How a person is

affected depends on individual personality plus hereditary factors. These are called "end-organ responses."

In other words, sudden anger may trigger a heart attack in one person, but another will have an asthma attack. Someone else will develop bleeding ulcers. Acute pancreatitis (a severe inflammation of the pancreas gland which interferes with the normal production of insulin), neurodermatitis (commonly called hives), acute colitis (inflammation of the colon), and sudden overactivity of the thyroid gland, which if untreated, can cause death within an hour, are all a result of stress.

What can you do to protect yourself?

"Since nicotine gives all the adrenal reactions noted previously, one obvious solution would be to stop smoking cigarettes," Dr. Duran said.

"Then, in addition to proper diet and exercise, learn to overcome or cope with stressful situations. For example, if you're afraid to talk in front of a group, take a public speaking course. Many people have found various forms of meditation to be extremely helpful in facing and eliminating many of the day to day stresses encountered in jobs and family life."

As part of the rehabilitation program at St. Joseph's Cardiac Rehabilitation Center, patients are encouraged to read *THE RELAXATION RESPONSE* by Herbert Benson, M.D.

As research continues into how stress affects our lives for good or bad, one thing seems to stand out: everyone has his individual stress level. What bothers one person excessively may not even ruffle another. A racing thoroughbred would find it just as stressful to be confined under a yoke with an oxen, as that ox would be if he were shoved up to the starting gate with expectations of competing with racehorses. Some are born to pull, some to run.

According to Gary Tague, administrative director at St. Joseph's Cardiac Center, cardiac rehabilitation is such a new field that there are only two schools in the United States actually

teaching it. The rehabilitation program at St. Joseph's includes diet, exercise and personal counseling for patients—who must be referred by a doctor—and their families.

"Of all the persons completing our program, which is now more than a year old, not one person has had a subsequent heart attack," Tague said.

But for those patients already facing the prospect of heart surgery, the Heart and Vascular Center of the Southwest at Sun Towers Hospital has a free brochure which outlines what happens to a patient from the time the diagnosis is made until discharge.

Mrs. Evelyn Baggins, director of nursing, said, "Preparation is necessary to allay the fears that every person facing heart surgery experiences. We actually refer to the period of explaining everything to a patient, as pre-operative teaching.

"The cardiology staff is completely patient-oriented. We'll explain and demonstrate where possible, every step that will be taken as many times as is necessary to reassure both the patient and his family. The wonderful thing is that many former patients have volunteered their time to visit both patient and family. It really helps to have someone say, 'Look, it happened to me three days ago, and I'm up and around.'"

Dr. John E. Liddicoat, cardiovascular surgeon, and his team, along with Drs. Harvey Seidenstein and G. J. Di Donna, cardiologists, have perfected heart bypass surgery to the point where the time required for surgery

has dropped from seven to less than three hours, on the average.

Sun Towers Hospital opened its Heart and Vascular Center in August 1975. One year later, nearly 150 people gathered to celebrate its first anniversary. Many of those in attendance were former heart patients, some of whom owed their lives to having had heart surgery.

The El Paso Heart Association sponsors a "Mended Hearts Club." Its 45 charter members, including Bud Lassiter, have all had open heart surgery and are back at their jobs.

These individuals give talks to organizations as well as on a personal basis, for those facing open heart surgery. Personal counsel and support to patients and their families includes staying with them during the period of surgery.

Mrs. Pat Zimmerman, regional director of the El Paso Heart Association, said, "Heart disease is still the number one killer. That's a position we don't want, so we're doing everything we can to change it.

"But change can only come through people being educated in how to take care of themselves to prevent heart disease. We're making efforts to begin this training with students in school. To make them aware of the necessity of good nutrition and a lifelong exercise program, we've been demonstrating CPR (cardio-pulmonary resuscitation) to all children in grades four through eight. In high school, we are teaching the actual techniques in their health classes. When they have successfully completed the program, these youngsters will be certified to administer this lifesaving technique."

The Heart Association is willing to train groups of seven or more people in CPR. It usually takes three to four hours, and consists of a film, demonstration, practice and test. Those successfully passing the test will be certified. Anyone interested may contact the local Heart Association.

It's never too late to begin a lifestyle that will enhance your chances to outwit the number one killer disease—heart attack. §



MRS. PAT ZIMMERMAN, regional director of the El Paso Heart Association, believes educational efforts are vital if incidents of heart disease are to be reduced.

TEST SHOWS SUSCEPTIBILITY TO ILLNESS

IF YOU WOULD LIKE to know how susceptible you are to disease, here's a quick way to find out.

At the University of Washington Medical School in Seattle, Drs. Thomas H. Holmes and Richard H. Rahe devised a "Social Readjustment Rating Scale" test, which lists 42 common life changes in the order in which they found them to be of importance as forerunners of illness.

Oddly enough, an outstanding personal achievement can often lead to disease. When Astronaut Edwin "Buzz" Aldrin Jr., the second man on the moon, returned to earth, he committed himself to a psychiatric hospital. He said: "None of us knew how to handle it."

The test is widely used now, especially in the armed forces, to determine how susceptible you are to a disease. If you have a score of less than 150 within a period of a year, you have only a 37 percent chance of getting sick within the next two years. Should your score be between 150 and 300, your chances of an illness increase to 51 percent. But if you score over 300, you are in serious danger, for the odds are 80 percent that you will have sickness within the next two years.

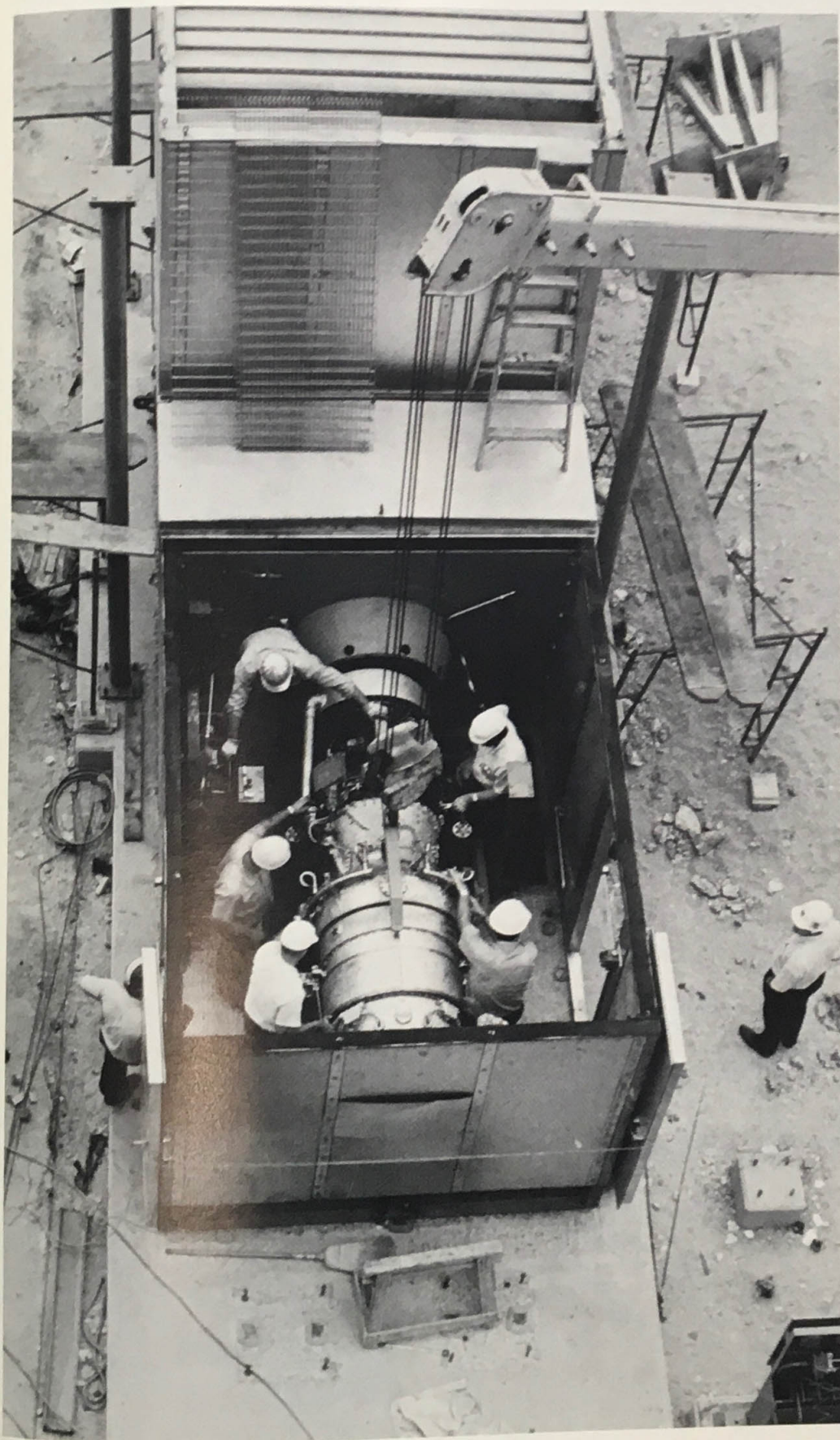
Dr. Holmes, a man with a wry sense of humor, says, "If you have more than 300 life-change stress producing units and get sick, the probability is you will have cancer, a heart attack or manic-depressive psychosis rather than warts and menstrual irregularities.

"On the other hand," he adds, "there are worse things in this life than illness. It is worse to go on in an intolerable, dull or demeaning situation."

STRESS PRODUCING INCIDENT	POINTS	YOUR SCORE
1. Death of spouse	100	_____
2. Divorce	73	_____
3. Marital separation	65	_____
4. Jail term	63	_____
5. Death of close family member	63	_____
6. Personal injury or illness	53	_____
7. Marriage	50	_____
8. Fired at work	47	_____
9. Marital reconciliation	45	_____
10. Retirement	45	_____
11. Changes in family members' health	44	_____
12. Pregnancy	40	_____
13. Sex difficulties	39	_____
14. Gain of new family member	39	_____
15. Business readjustment	39	_____
16. Change in financial state	38	_____
17. Death of close friend	37	_____
18. Change to different line of work	36	_____
19. Change in number of arguments with spouse	35	_____
20. Mortgage over \$10,000	31	_____
21. Foreclosure of mortgage or loan	30	_____
22. Change in work responsibilities	29	_____
23. Son or daughter leaving home	29	_____
24. Trouble with in-laws	29	_____
25. Outstanding personal achievement	28	_____
26. Wife begins or stops work	26	_____
27. Begin or end school	26	_____
28. Change in living conditions	25	_____
29. Revision of personal habits	24	_____
30. Trouble with boss	23	_____
31. Change in work hours, conditions	20	_____
32. Change in residence	20	_____
33. Change in schools	20	_____
34. Change in recreation	19	_____
35. Change in church activities	19	_____
36. Change in social activities	18	_____
37. Mortgage or loan under \$10,000	17	_____
38. Change in sleeping habits	16	_____
39. Change in number of family get-togethers	15	_____
40. Change in eating habits	15	_____
41. Vacation	13	_____
42. Minor violations of law	11	_____
TOTAL		_____

At El Paso Products' Butadiene Plant

COSTS DROP DRAMATICALLY WITH JET INSTALLATIONS



THE BUTADIENE PLANT at El Paso Products Company at Odessa, Texas, is designed to produce 94,000 tons of butadiene annually. It utilizes the hot air exhaust from two jet aircraft engines to regenerate catalyst used in the process.

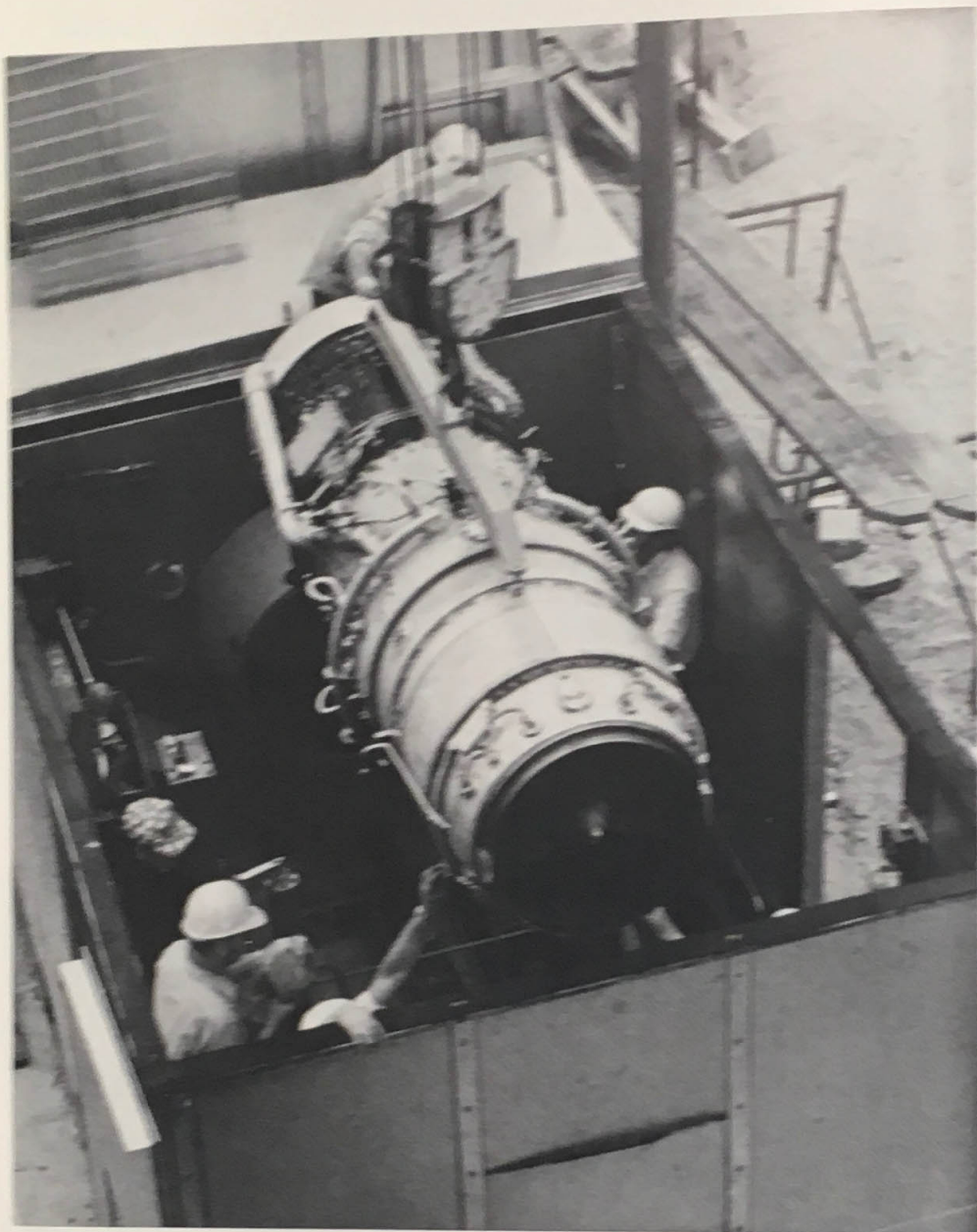
Although other industrial uses have been made of modified jet engines, the dual installation at the Products Company is the only known application of such engines for catalyst regeneration on the American continent.

Butadiene is produced by running butane feedstock through reactors in which hydrogen is removed from compounds by a chemical process. This separating process leaves an ashy carbon residue on the catalyst bed in the reactor.

The oxygen-rich exhaust from the two 15,000-horsepower engines is extremely hot (approximately 1,000 degrees Fahrenheit). At 150 pounds per second air flow from each jet engine, the exhaust passes through the catalyst beds, burning off coke and carbon build-up. This action regenerates the catalyst in each reactor for the next load of feedstock.

"The original plant used the exhaust from industrial gas turbines, but due to maintenance problems and unreliability of the industrial units, we began looking into the possibility of using jet engines in butadiene production shortly after the plant was started up," explained Sam Gipson, project engineering manager. "At that time, engineering learned that several jet engines were available. We were considering modifying them for use as

SWITCH to jet engines to regenerate catalyst used in the process to produce butadiene (used in the manufacture of rubber tires) has reduced approximate maintenance costs from \$200,000 to \$25,000 at the Butadiene Plant.



FUEL COSTS, as well as maintenance time, have been reduced significantly.

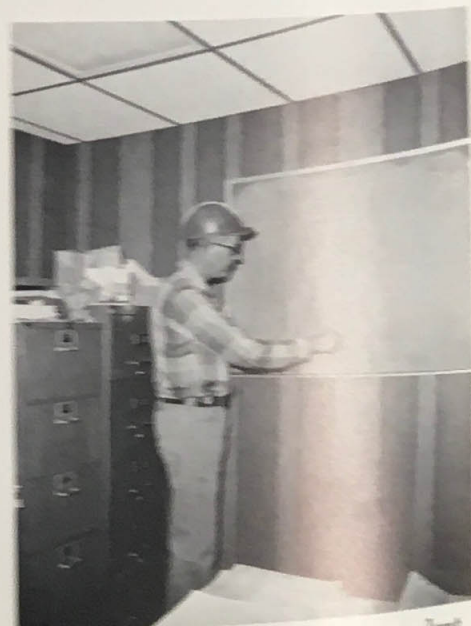
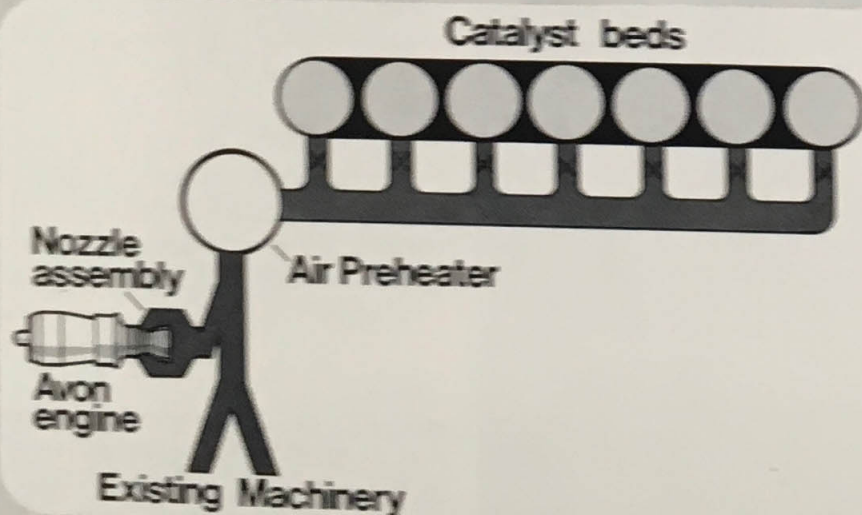


John Weir, engineering specialists manager



Sam Gipsom, project engineering manager

Butadiene-regeneration installation



Bill Wright, construction superintendent

spare engines during the time the gas turbines were down for maintenance.

"There were several drawbacks to the project at that time," added John Weir, engineering specialists manager. "Confining the high temperature, high velocity exhaust in pipes was just one of the problems. In normal use, jet exhaust is vented into the atmosphere, providing enormous thrust that propels the plane.

"Exhausting a hot stream of air with such high velocity into a closed chamber presents special problems," he said. "Anything we welded inside the pipeline to control the flow of exhaust could possibly be vibrated loose and sheared off and carried along. Any bend in the piping created unwanted turbulence, and the stainless steel pipe had to be reinforced and bolted securely to anchors to prevent movement.

"In 1972, we were faced with a decision," Gipson said. "Within a year the gas turbines we were using would each have accumulated more than 100,000 hours of running time and would have to be replaced.

"We consulted several companies regarding the possibility of modifying a jet aircraft engine for our use. It was still considered unfeasible. Overcoming the pulsating back pressure in the reactors was still the major obstacle."

Then, during a discussion with a representative from Scotland, Gipson suggested that perhaps a 'critical flow' nozzle could be used effectively to control the back pressure. At first, the idea was dismissed.

A month later, however, Scottish engineers called with good news. They had designed a 'convergent/divergent' nozzle (see diagram) utilizing a shock wave set up by passing the sound barrier with the exhaust air flow. This shock wave barrier would effectively allow the jet to operate at a constant pressure while discharging into the varying back pressure of the reactors.

Bill Wright, construction superintendent, said "Preplanning included building a housing with a trolley rail to facilitate handling the engine. The 48-inch stainless steel pipe which would channel the exhaust to the reactors couldn't be prefabricated; it

had to be cut and fitted on the spot."

John Lafrentz, butadiene plant manager, said, "There are several major advantages in using jet engines. There's less downtime for repairs, less maintenance is required, and we get much better regeneration efficiency. That is, the jets take in much more air for the same amount of fuel burned."

Based on the successful application of the first jet engine, a second one was installed in November 1975. The two engines are the main source of regeneration air for the plant, and one of the original industrial gas turbines is kept for possible use on a stand-by basis only.

"In the course of developing the modifications necessary for using jet engines in the butadiene plant, we talked with many companies during the late 60's and early 70's" explained Jim Arnold, general engineering and construction manager. "Interest in developing the capabilities of the engine was high, but at that time no one had accomplished this unique type of conversion. There was nowhere we could go to find out whether or not it would actually work.

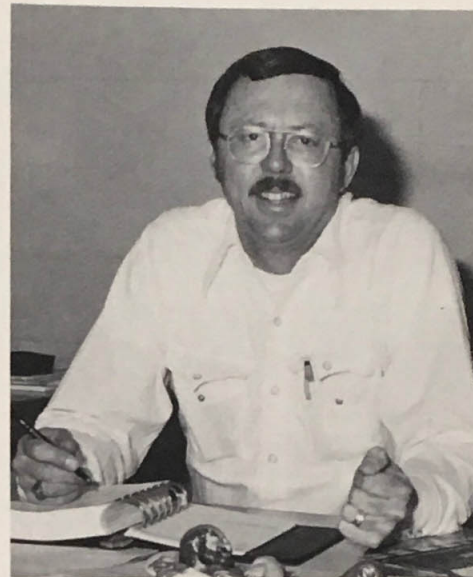
"In fact, one jet engine manufacturer told us they would not even supply us with a proposed design, because the application could possibly cause problems in their jets.

"But our engineering department had worked on and studied the problems. In spite of the negative feeling from many people, we were convinced it could be made to work and result in tremendous savings for us.

"Of course, there were risks involved, too, but we presented the idea, along with our recommendations, to our management group.

"They told us, 'All right, we like what you're saying. If you believe in your engineering analysis, we're willing to back you.'

"Since we installed the first engine in 1973, we've cut regeneration air compressor maintenance costs by more than two-thirds. These engines need to be serviced only once every two years, and we've effectively lowered our fuel consumption costs due to the greater efficiency of the jet engines.



John Lafrentz, butadiene plant manager



Jim Arnold, general engineering and construction manager

"As successful as this application of aircraft engines to chemical production has been," Arnold said, "to my knowledge, it is still the only installation in the U.S. Our management paid the engineering department a real compliment when they supported this project, accepting the risks that were involved. We're as proud of that as we are of the success of our engines."§



Six Afloat & Three to Go

THE *El Paso Cove Point*, sixth ship in El Paso's new fleet of nine liquefied natural gas carriers and the third such El Paso ship to be launched in the United States, slid gracefully into the Mississippi River during launching ceremonies late in 1976 at Avondale Shipyards in New Orleans, Louisiana.

Mrs. Agnes Clarke, wife of Bernard J. Clarke, chairman of Columbia Gas System, Inc., christened the vessel. Brightly colored balloons, streaming confetti and a thunderous blast from a Revolutionary War cannon heralded the christening. Tug boats moored the *Cove Point* several hundred yards downstream next to her sister ship, the *El Paso Savannah*, for final outfitting. At least one and a half years of additional work will be required before the ships enter service.

Like her eight sister ships, this 125,000 cubic meter ship will transport LNG from Algeria to the United States east coast. This ship carries the name *Cove Point* in recognition of the fact that about two-thirds of the gas will be delivered at Cove Point, Maryland, for sale to subsidiaries of Columbia Gas and Consolidated Natural Gas Company.

Principal speaker at the launching was Howard Boyd, chairman of the El Paso Company.

"There are other features besides the great engineering feat that justify being mentioned at this time," Boyd said. "Obviously, a great vessel costing in excess of \$100 million — and there are two others being built in this same yard — provides employment to thousands of people in this shipyard.

"Aside from that, this construction provides employment in other areas of the country where various component parts are manufactured and shipped here for assembly. These ships, and the project they represent, also serve the economy of Algeria, which has a surplus of natural gas so badly needed in our country. In addition, it provides a healthy domestic maritime industry essential to our national security.

"So often we read in the newspapers about the energy crisis, and I suspect that many in this audience do as I often do, and equate that in terms of oil. Today we hear that approximately 50 percent of this country's oil needs are now being imported. It is a surprise to many people to learn that natural gas from domestic production satisfies much more of our nation's energy needs than does domestically produced oil.

"Until there was a deterioration in our gas supply, natural gas supplied over one-third of this country's total energy requirements, and it supplied over one-half of the energy required outside of the known transportation demands. And yet, in the last five years, we have consumed natural gas supplies at twice the rate at which they have been replenished by discovery. There will be an inestimable catastrophe if steps are not taken to replenish that which we are consuming at such a fast rate.

"Unfortunately, there is of necessity an inherent time lag upwards of five years in supplementing the supplies of gas being exhausted in this country. The ship that you see here is part of a project that will become operational during the fourth quarter of 1977. It will take a period of about nine years from the time the contracts were executed to fully develop this source of supplementary supplies.

"You are witness to an important event in history because this project will be the first to bring such huge quantities of liquefied natural gas from such distant places as North Africa.

"Aside from supplementing our energy supply, the project will promote commercial intercourse between this nation and one of a differing political philosophy. Historically speaking, such intercourse can well serve the interest of peace.

"With that comment I would like to close, invoking God's blessing on this ship and the crews that will sail her, bringing essential energy to the United States over the next 25 years."§

THE FAMILY TREE

Growing Your Own

DAN BRENNAN is a gardener of sorts. For the past 30 years or more, he has been digging around the roots and shaking the branches of his family tree.

His genealogical cultivation has managed to produce documented evidence of numerous lines of Scotch, Irish and English ancestors, some as far back as 300 A.D. That's on his mother's side of the family. His father's ancestors are a little more difficult to track down — partly due to the fact that the Brennan branch is so fruitful, and also because every generation of Brennans used almost identical given names.

"In the national telephone directory in Ireland, there is a full page and a half of just Thomas Brennans," Dan explained. "Every time I think I'm coming close I discover that it's the wrong Thomas, and my grandfather has gone underground again."

What is it that causes a person to spend time and effort — and money — tracing his ancestors? Isn't what's here and now the important thing?

"Well, it just seems to be an inborn desire to want to know something about your parents," Dan responded. "Maybe it's because as children, we hear comments like, 'You're just like your grandfather,' or 'You take after your aunt or uncle.' It seems to me to be only normal curiosity to discover



THE MacNAB, by Raeburn, portrays Francis MacNab, who became the 12th Laird of MacNab in 1778. He is in the uniform of a Lt. Col. of the Breadalband Fencibles. Dan Brennan, now retired from the Company, is the archivist for the McNabb Clan.

The McNabb Clan Association of America was officially recognized in 1975 as connected to the original clan society in Edinburgh, Scotland. Dan serves as the archivist for the McNabb clan in America.

"There's another interesting facet to studying your genealogy," Dan said. "As your family tree begins to take shape, you find that your ancestors took root at

all levels of society. And very often, their children climbed up and down the 'social ladder' with great regularity.

"So, while some people investigate their genealogy looking strictly for the prestigious branches, they had better be prepared to find at least a few stubs growing further down on the trunk."

Dan related that his great-grandfather McNabb was a farmer. That was his life's ambition and he never

desired to do anything else. His brother, however, was a doctor. The offspring of the two brothers generally followed in the footsteps of their fathers. The farming father produced farmer children, while the doctor's children generally chose a professional career.

Among the upper branches of his mother's family, Dan has documented evidence that he is related to 12 Magna Carta sureties, six Revolutionary

patriots and three Knights of the Crusades.

The Magna Carta was the great charter of English liberties granted by King John in 1215 under threat of civil war. Twenty-five barons were chosen to be guardians of the charter, or to ascertain that the king did abide by the articles of the charter. In effect, they provided security, or surety.

The trail of his ancestors has led Dan to search dusty basement storages in li-

POPULAR event at the gathering of the Clans, was the tossing of the Caber, a 20-foot, 120-pound telephone pole.



water, many machines, old
concrete records, old
tiles and laundry records,
like old records in the
Saint John, England, he-
lmet and helmet, to search
it down.

He has made three trips
down, in 1966, 1970 and
1975 to collect on the last
trip. Dan told of a harrow-
ing incident that happened
at the airport.

"We were all waiting for
our flight — there was quite
a group — and a patrol of

English soldiers came
through the airport. I guess
they patrol it pretty regu-
larly. It was obvious they
were ready for trouble, the
last man in the patrol
walked backwards to pro-
tect the group from attack
from the rear.

"Anyway, just as they
came by, someone kicked
a sandfilled ashtray and it
went clanging to the floor.
It scared everybody and the
patrol immediately levelled
their guns. When they real-
ized what had happened, it
seemed like everyone in the
airport started to laugh at
the soldiers. It was an up-
saw. The soldiers were em-
barrassed, but they resumed

their patrol with a very stic
attitude. It seems as though
the laughter went on for
nearly 30 minutes.

"It was a very tense situa-
tion. The fighting had been
going on for some time. I
saw windows shot out, and
many of the top floor win-
dows in buildings were
boarded up as they had
already been shot at."

But most genealogical
searches take place under
much less exciting circum-
stances. It takes a great deal
of patience, a mind for de-
tails, and persistence.

Just as today, our imme-
diate ancestors managed to
move from place to place
with great frequency. It's a
rare thing to find even two

or three generations of one
family at one location.

Even as they looked for
new horizons and greener
pastures, however, they left
records behind them. Births,
deaths, marriages, property,
and sometimes court case
records are in existence.
Those are the records that
you must find to verify the
facts regarding their lives.

The logical place to start
your search is with your
immediate relatives. If your
grandparents are still alive,
chances are excellent that
they can give you informa-
tion concerning their par-
ents and grandparents, as
well as approximate times
and places they lived. Fam-
ily Bibles are quite often a
storehouse of information.
Wills are another source on
which to build your family
tree.

There are county records,
state records, church re-
cords, census records, li-
braries with genealogical
sections and federal ar-
chives to be searched. If
your interest in history was
less than enthusiastic, you
may find that attitude
changing as you follow your
family back further in time.

Genealogy no longer con-
cerns itself with the exclu-
sive lineages of nobility, but
has an equal fascination for
all sorts and conditions of
men, as family traits, char-
acteristics and abilities tend
to repeat themselves in suc-
cessive generations.

What's in a name? Ac-
cording to Shakespeare's
lovelorn Romeo, "That
which we call a rose by any
other name would smell as
sweet." To Dan Brennan,
and his fellow genealogists,
a name is everything — it's
a key to discovering who
you are. §

A BOMBY LASS identifies her-
self as a clan member by her
colorful skirt, hat and purse.



A chip off the old rock

Turns Sandstone To Sculpture

JOHNNY VIGIL's tanned, weathered face and work-toughened hands exhibit little outward evidence of the accomplished artistry of this modest man. Neither, in fact, does his daily work, which is being a member of a pipeline survey crew in the San Juan Basin.

In spare hours, Johnny carves chunks of sandstone, collected from surrounding areas of the San Juan Valley, into animals and people — or whatever happens to strike his fancy.

"I used to whittle a lot when I was a kid," Johnny explained, "and this is just whittling on a bigger — and different — scale."

If it weren't for the enthusiastic backing of his fellow workers in the San Juan Division office in Farmington, Johnny would probably still be giving away all his sandstone sculptures to anyone who evinced an interest in them.

H. L. "Doc" Hadlock, San Juan plant facilities inspector, is one of his biggest boosters. And he's the proud possessor of Johnny's first sculpture — a lizard poised on a rock, seemingly ready to skitter away at the first hint of danger. This lifelike reptile occupies a prominent place on Doc's desk, along with some later carvings which include a coiled rattlesnake. Few people seem to care to touch the snake.

In the two years since he began sandstone carving, countless inert blocks of soft stone have metamorphosed into fledgling eagles struggling with their first flight, or shambling bears, shaggy, hump-shouldered buffalo, powerful mountain sheep with

great curving horns, as well as fish, lizards, snakes and birds. All his carvings have such appeal that all he has to do is show them and they're sold.

"Hey, Johnny, how much for this one?"

Johnny shrugs uncertainly and glances at Doc.

"C'mon, Doc, John's too modest. You set the price. How much?"

Doc grins a little, savoring the moment. He tugs at his elegantly waxed and curled mustache, then names an outrageous price.

Amid the whoops and whistles, someone shouts, "Does that include your 15 percent, Doc?"

"Be serious, now, Doc. I've got to have that bear... just look at the expression on its face."

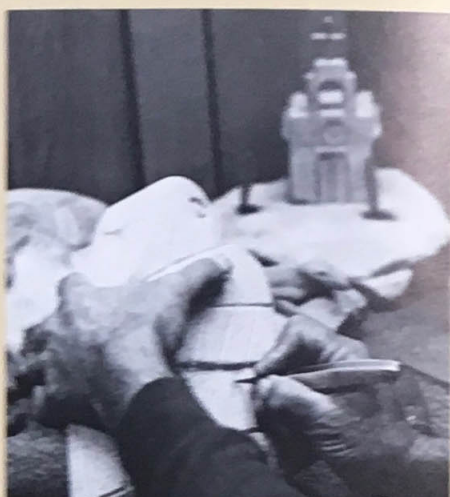
After more good-natured joshing the price is settled and another of Johnny's engaging sculptures has found a good home.

Johnny carves in two distinct styles, perhaps reflecting both the Indian and Anglo heritages in his family. One large eagle is very square and stylized, much like the carvings on ancient temples in Inca/Aztec/Mayan cultures.

Some of his sculptures could easily be mistaken for artifacts from an archaeological dig. Others — such as his bear and crow — are very realistic, very contemporary.

Ideas for stone carvings come from many places, Johnny explains. Sometimes the shape of the stone determines what it will finally be.

"Lots of times I'll start carving with something specific in mind," he said,



SKILLED HANDS of sculptor Johnny Vigil place finishing touches on a glowering eagle. Once the basic shape is carved, Johnny utilizes just a few lines and circles to give character. Doc Hadlock admires Johnny's work, shown in samples below.

"and as I work the stone, it just changes. It's almost like the stone does the deciding. I guess that's why no two carvings are ever just alike, even if they're of the same thing."

Several exhibits of Johnny's sculptures have been arranged by his co-workers.

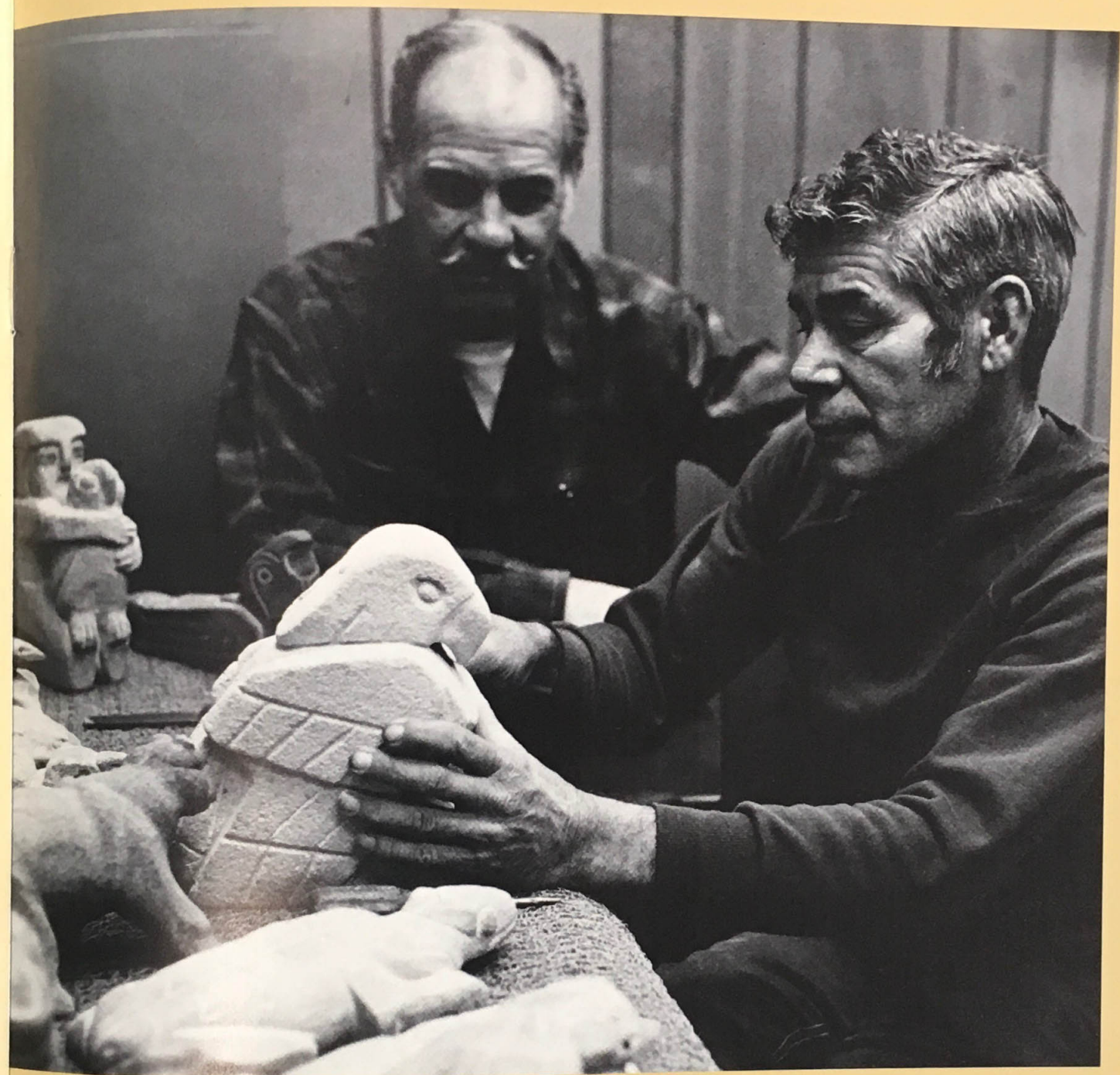
"The problem is," he said, "that I have a hard time keeping enough pieces on hand to put on a show."

But his grin makes it evident that he takes as much pleasure in others' enjoyment of his handiwork as he received out of creating the carvings.

Johnny's sculpting tools are a chisel, chipping hammer, and a tungsten steel carbide file. Oh yes. And a pocketknife. With a very worn blade.

With these few simple tools and a chunk of rock, he creates wildlife that he often sees in his surveying work, or in his travels throughout the San Juan River Valley. They are creatures that live quietly — and for the most part, unseen — in the arid Southwest.

Johnny understands and cares about his quiet world, and this concern is evident in his sandstone desert denizens. They are indefinably and indelibly imprinted with the feelings and personality of Johnny Vigil, whittler in stone. §



(And nickels, dimes, quarters and halves)

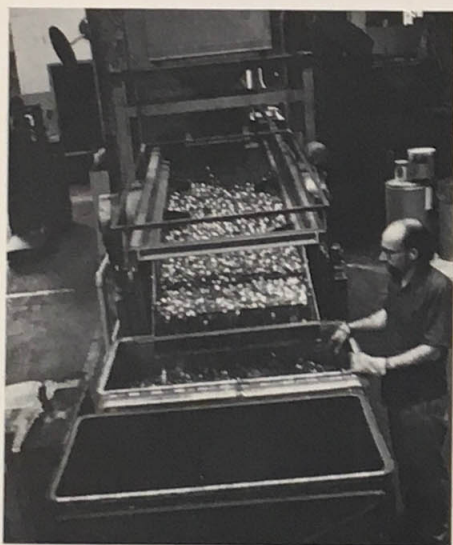
PENNIES FROM DENVER

MAKING PENNIES is not penny ante business. The United States Mint at Denver, Colorado, makes an average of 28 million coins per day and 75 percent of them are pennies. That's 21 million new pennies every day. Purses and pockets must bulge with all those jingling copper coins.

"Not so," laughs Mrs. Betty Higby, superintendent of the Mint. "It's a real mystery to us just where all those pennies go.

"We surmise that between collectors who stash

IN ADDITION to making coins for Americans, recently the Denver Mint has been producing coins for many foreign countries.



THE GOLD displayed is valued at \$1.23 million based on the government price of \$42.222 per ounce. Market value? More than \$3 million at prices in mid-January.



them away, and people who come home at night and empty their pockets into a change jar, and those who consider pennies so worthless they won't even stoop to pick one up from the sidewalk, pennies are just not being kept in circulation. But we honestly don't know just what does happen to those millions and millions of coppers that we mint every day."

Pennies, made from a copper and zinc alloy, contain 95 percent copper and 5 percent zinc. It costs .74

(seven tenths of a cent) to make a penny. It costs the same amount to mint a dime. A nickel costs 1.5¢; a quarter is about the same — 1.6¢. A half dollar costs 3¢ and the one dollar piece, when it is in production, costs 6.5¢ per coin. As costs of basic metals and manufacturing costs change, the cost per coin fluctuates.

Mrs. Higby said, "A daily statement is prepared by our accounting office that I must sign, which is sent to the U.S. Treasurer's office. Among the items listed

is the amount of seigniorage on each day's production of coins.

"As you may know, seigniorage is the difference between the face value of the coin and the cost of the metal it is minted from. That figure varies, of course, but very rarely does it drop below a million dollars a day. So the Mint pays its way and makes a profit for the government, too."

Nickels contain a combination of 75 percent copper and 25 percent nickel. This combination or alloy, called

"cupro-nickel," is a standard alloy for coins the world over.

With the exception of pennies and nickels, all other coins are made in three layers — like a sandwich — and called "composite coins."

Visitors to the Mint watch with fascination from a glassed-in balcony as coins cascade from machines in various stages of production. Children delight to see workmen wheel in large rolls of copper and cupro-nickel weighing from four





MRS. BETTY HIGBY is superintendent of the Denver Mint.

to six thousand pounds. Overhead pulleys slowly lift the rolls, mounting them on spindles attached to stamping presses.

From the spindles, the sheets of metal feed into blanking presses which punch out round pieces of metal of the proper sizes, called "blanks." At this point, as they tumble into large baskets, they look more like play money than real coins. Leftover metal from the stamping, or blanking, operation is recycled.

Hildreth Frost, Mint assayer, explained that his department assays samples from every strip that comes into the Mint.

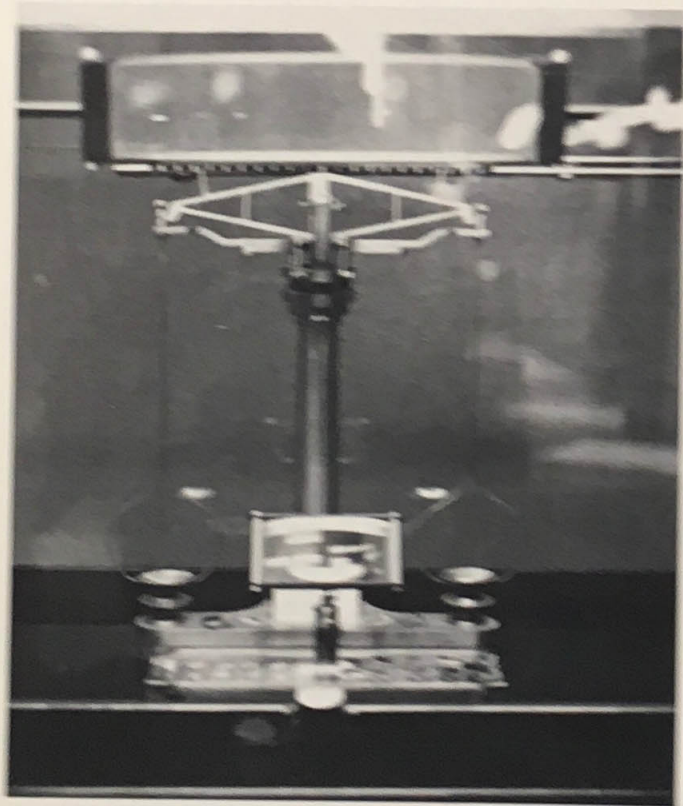
"General specifications state that samples may vary up to 10 percent," he said, "but we actually hold it to within 0.25 percent (twenty-five hundredths of one percent).

"In addition to assaying the purity of the rolls of metal, we have three inspectors who watch the quality of the physical condition of the rolls. They check to be sure they're clean and have been rolled properly. They're concerned with whether or not the rolls are of consistent thickness and they test the hardness of the metal."

After punching, the blanks enter a gas furnace to be softened for stamping, in a process called "annealing." Temperatures in the annealing furnaces reach 1400 degrees Fahrenheit, causing the blanks to become red hot.

After cooling, the blanks are washed and dried. Then a machine called an "up-setter" rims the edges. The blanks have now been prepared to receive the impression which makes them valuable as units of monetary exchange.

The stamping machine



FINELY-BALANCED scales are used to weigh small amounts of metals or chemicals. At right are newly minted pennies.



impresses both sides of four coins at a time, operating at a rate of 135 times a minute. One machine produces 540 stamped coins every minute of the working day.

Individual coins receive their impressions from steel coinage dies made in Philadelphia, and are shipped under very tight security to the Mint at Denver. Once they begin to show wear, the dies are destroyed. Meantime, they are kept under guard in a vault to which very few persons have access.

Occasionally, a coin enters the stamping machine a little off-center, resulting in an imperfection.

"Although we screen every coin to be certain each one is perfect," the guide explained, "every once in a while, to the special delight of collectors, an imperfect one gets into circulation. But our inspectors manage to keep bad coins to a minimum."

After this final inspection, automatic machines tabulate individual denominations, bag them in specified amounts and sew the bags shut. This shiny new money does not immediately go into circulation, however, but is shipped to Federal Reserve Banks from where disbursement to member banks actually starts it on its journey into the economy.

Congress established the Denver Mint in April 1862. At that time, a company called Clark, Gruber & Co. purchased gold from miners and manufactured five and ten dollar gold coins for circulation.

In September 1863, the government acquired the facilities of Clark, Gruber &

Co., and the Mint began business with melting, refining, assaying and stamping cast gold bars.

The Mint operated essentially as an assay office until 1906, when it added coinage to its operations.

In the first year of coin-making, 167,371,000 coins were produced. Today, annual production totals 6 billion coins, and full-scale assaying is no longer done.

The Mint is housed in a five-story, block-square granite and marble building facing East Colfax Street between Delaware and Cherokee Streets. This imposing granite building of high interior ceilings and creamy marble arches and pillars is a monument to the builders of the 1900's. Impressive wall and ceiling murals painted in muted

colors, as well as marble sculptures on walls and cornices make viewing the building as interesting as watching the production of coins.

Armed guards, stationed at all entrances, are also very much in evidence throughout the building. They maintain a thoroughly professional, business-like attitude, yet at the same time manage to be friendly and helpful. All visitors undergo a routine check when they enter and leave the Mint, much as they do at airports.

Outside the building, a spiked black wrought iron fence completely surrounds the Mint, intensifying the feeling of tight security. It seems to warn passers-by that something special is housed within.

"Although the Mint has been designated as a historical landmark and will therefore not be razed, we may not be located in this lovely building much longer," Mrs. Higby said thoughtfully. "We outgrew our manufacturing space several years ago and we've been having to put up with quite a few inconveniences in the production of coins as a result."

"Recently a tract of land was purchased for the building of a new Mint. However, a bill to construct a new facility was introduced in the 94th Congress, but did not get out of the Banking, Housing and Urban Affairs committee before Congress adjourned. Hopefully, the bill will be re-introduced, and we'll have a new Mint building soon."

"While this building is a lovely monument," she smiled, "and possesses great charm, it leaves a great deal to be desired as a production plant."

Philadelphia has the only other coin production facilities in the United States, although proof coins are now manufactured by the United States Assay Office. They bear the letter "S". The West Point Depository presently coins pennies because of the current shortage.

A tour of the United States Mint at Denver is both impressive and educational. And who knows? Perhaps the coins being made on the day of your visit will contain metals mined from Arizona's Lakeshore Mines, a joint venture of The El Paso Company and Hecla Mining Company. §



ROLLED SHEETS of copper and cupro-nickel are placed on spindles and automatically fed to "blanking" presses for sizing.

EXCEPT during working hours, when they are required by Sonatrach to wear European-style clothing, the rural Algerian women still wear their traditional attire. Ken Corder poses here with one of the domestics at the compound.



algerian adventure

El Paso's Engineer/Professors Look, Learn, Remember, Report

WHILE ON AN OVERSEAS assignment, El Paso Natural's two engineers-turned "college professors" — Ken Corder and Charles Dellert — conducted classes in compressor station operations, station management and trouble shooting for 37 employees of Sonatrach, the national Algerian oil and gas company.

When not in the classroom, El Paso's two engineers took advantage of their unusual opportunity to explore Algeria.

During their travels, Corder and Dellert observed firsthand a portion of the globe most of us only read about or glimpse on TV. They found Algeria a vast and varied land, its people eager to learn.

"We left America on a Saturday morning and arrived in Algiers 22 hours and six time zones later," recalled Corder. "Even a stopover in London didn't relieve the 'jet lag' we experienced.

"From the air, Algiers appears a beautiful patchwork of modern glass buildings interspersed with ancient white-topped Arab sections," noted Dellert. "The city surrounds an impressive crescent-shaped natural har-

bor and serves as the commercial hub for the entire country."

Upon landing in Algiers, airport security guards escorted the El Paso employees to immigration and customs where government officials asked them the usual questions. Only this time the questions were posed in French. When they didn't understand a single word, they immediately realized that the \$18 French record lessons and their pocket dictionaries were inadequate.

Dellert said that traffic congestion in Algiers compares with any large American city, the only difference being the size of the cars and trucks. Algerians, he noted, drive more aggressively.

Dellert and Corder found the Algerians cooperative, eager to learn. Sonatrach's students included station chiefs, shift supervisors and pipeline and compressor station maintenance foremen.

"While in the city, we stayed at the Hotel Aurassi," Corder commented. "The Aurassi was the most impressive

and modern facility we saw during our assignment. Rooms were spacious, clean, well furnished and relatively expensive. A single room cost 250 dinars a night, about \$62.50 U.S. currency, and a drink in the hotel bar ran upwards of 10 dinars. Each dinar equals roughly 25 cents.

"We found several excellent restaurants in Algiers," he remarked, "but none with menus in English."

Lunch or dinner includes at least three courses and commonly lasts two hours or more. Soup or shrimp are served first, followed by fresh fish or an omelet. The main course includes meat or fish with fresh vegetables. Interestingly, Algerians, like the French, eat their salad after the main course. Dessert consists of fresh fruit or cheese and is served with cups of thick, black coffee. Beer or wine with the meal costs extra, and bottled drinking water must be ordered separately. A typical meal at one of Algiers' better restaurants costs anywhere from 60 to 85 dinars (\$15-\$22) per person plus tip and beverages."

From Algiers, Corder and Dellert traveled inland by private automobile to Laghouat, a Saharan oasis 400 kilometers (250 miles) south of the coast and one of Sonatrach's pipeline service facilities.

The Atlas Mountains separate the fertile coastal belt from the arid Sahara.

"The day we crossed the Atlas, rain was falling in buckets. Cascading rainwater created spectacular waterfalls at every turn of the narrow highway.

"We also encountered wild monkeys which inhabit the rugged mountains and are protected by owners and customers of a private resort. They appear totally unafraid of humans and we observed several clowning for candy from tourists. The monkeys put on quite a show, much like the bears in Yellowstone."

On the southern or leeward side of the Atlas, the terrain gradually changes from mountains to hills as the narrow

highway snakes down toward the desert floor.

"The Sahara at this point is not completely barren, but to our surprise rather like El Paso or Jal with rocky hills and small patches of vegetation," Corder explained.

"Laghouat looks just like a scene out of *National Geographic* — adobe buildings, ancient mosques, men wearing traditional baggy pants and turbans, women covered except for one eye, donkeys pulling small carts or drawing water from wells, and nomadic Bedouins riding camels. The scene reminded me of a Hollywood movie set, complete with actors right out of central casting."

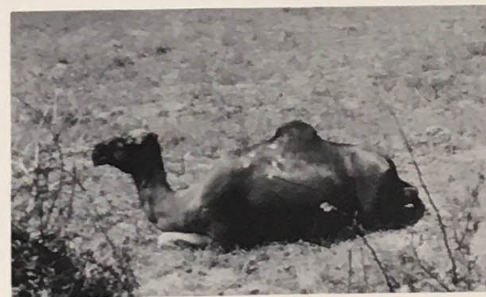
Dellert said Laghouat sports several small stores, most shopping takes place early in the morning in an open field near the edge of town. Nomads herd sheep, goats and other livestock to sell or trade, farmers cart fruit and produce, and local merchants set up tents literally bulging with assorted odds and ends for sale. The final result resembles a colorful flea market with

shoppers emphatically haggling over prices.

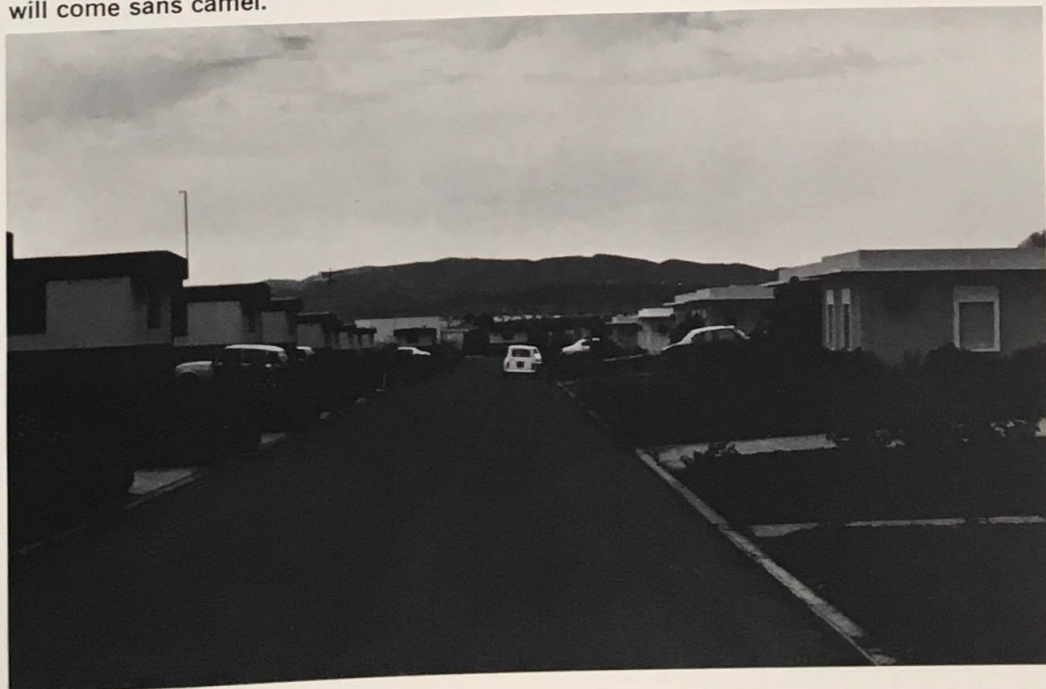
Before the two Americans arrived, the Algerian students had successfully completed seven months of training in algebra and higher math, chemistry, physics and engineering sciences.

"We inspected Sonatrach's new pipeline service complex," Corder said, "and visited with several supervisors. Many were young engineers who, like most Sonatrach employees we met, were friendly and were well qualified for their assignments."

After leaving Laghouat and visiting two compressor stations under construction further south, Corder and Dellert returned to the coast and established residence at Zemmouri El Bahri, a small fishing village east of Algiers.



EL PASO'S employee camp, still in the planning stage, will probably resemble this modern compound built to house an American construction force. The camp, however, will come sans camel.



Here, Sonatrach provided living quarters for foreign faculty members teaching at the National Petroleum Institute.

They lived in a small masonry villa on the beach in an unfenced compound originally built by Sonatrach for vacationing middle management employees.

"We encountered perfect weather during our three-week stay on the coast," Dellert said. Even though their villa wasn't air-conditioned, it was usually quite pleasant with cool sea breezes and temperatures ranging from 65 to 80 degrees.

"The surrounding countryside was primarily rural and agricultural," Corder said. "Villagers in Zemmouri El Bahri lead slower lives than do their counterparts in Algiers. They have time to stop and visit with each other, like small town Americans, and seem to depend more on each other than do city-dwelling Algerians.

Even aided by interpreters, language difference did cause minor problems. Some technical terminology seemed to defy interpretation.

Both Americans agreed that shopping in rural Algeria was an experience in itself, especially when you don't speak the language. "Take grocery shopping for example," Dellert said. "You can't just run down to the local supermarket like you do back home. Since no one store carries all the items you want, it is common practice to shop each day in several small stores. Sometimes you even have to travel to neighboring villages to find all that you need."

When you don't speak French or Arabic or Berber, you end up pointing and using crude sign language.

"Some items we Americans consider necessities are still considered luxuries in North Africa. Items such as T-bone steaks, aluminum foil, catsup, paper towels, frozen foods, bleach and modern kitchen utensils are not available in rural Algeria. Of course, bacon and other pork products are unavailable



THE COURSE taught by Corder and Dellert concluded the training program. Sonatrach and faculty officials pose following graduation. Dellert is second from right.

because of religious beliefs. We also found that stores did not carry any inventory except for what was on the shelves and did not reorder until completely exhausting supplies on hand. Therefore, some goods were available only on certain days of the week. Bottled drinking water, for instance, was usually available on Tuesday, Wednesday and Thursday at the small general store we frequented in Boumerdes."

Corder interjected, "The quality of some Algerian foods, particularly fish, bread, fruit and vegetables, was much better than back home. Algerian fruits and vegetables are vine-ripened and much more flavorful. Fish, of course, was fresh daily, although variety depended on the local catch. And their coffee was the best I ever tasted.

"Bread was also quite good and cost only about nine cents a loaf. But long lines at the bakeries did cause some inconvenience. One day the bakers stopped selling bread completely because the line was not orderly. We found meat prices comparatively high, about \$3.50 per pound. Butchers charge the same price for all meat cuts, from roast to hamburger."

Everywhere Corder and Dellert journeyed, they were extremely impressed

with the Algerian people. "I can't recall meeting a single unfriendly Algerian during our entire stay," thought Dellert. "Everyone we met, from Sonatrach management on down to the local man on the street, was exceptionally friendly and helpful."

Corder offered an example. "You walk into a crowded grocery store looking for a bottle of cooking oil. You don't know where to find it, or what to ask for, or even what size or shape bottle it comes in, or if it comes in a bottle at all. Yet, the busy merchant who can't speak English, patiently assists you in your search. You find out quickly what kind of people you're dealing with. That's what we enjoyed most about our assignment—the wonderful people. The Algerian people made our trip."

Dellert said, "All of our Algerian students worked hard and were well qualified, attentive and studious. They were friendly and very much interested in El Paso's experiences. I firmly believe that Sonatrach's training programs will produce some of the most knowledgeable personnel in the gas industry."

To protect prehistoric sites:

Contract Archeology



IN A CURIOUS WAY the nation's increasing hunger for oil and natural gas may result in a better understanding of prehistoric Indians in the American Southwest.

Nowhere in this region of abundant early Indian sites is this more evident than it is in El Paso Natural Gas Company's San Juan Division.

Laws protecting antiquities, combined with growing oil and gas well activity, have resulted in increased archeological study of ancient Indian sites that face possible disturbance.

Located in the Four Corners region of northwest New Mexico, the Company's San Juan Division operations extend from Durango, Colo., in the north to Cuba and Gallup, N.M., in the south. Bounded on the west by a portion of Arizona north to Aneth in the southeastern tip of Utah, the Division extends east to the Jicarilla District of the Carson National Forest in New Mexico.

It is an area rich in prehistoric Indian artifacts and remains the home of modern Indian tribes including the Navajo, Jicarilla Apache and Utes.

The area contains evidence of a nearly complete spectrum of prehistoric man in the American Southwest, dating from 10,000-year-old Folsom stone points to the Pueblo Refugee from 1680 to about 1730. Early Navajos are known to have migrated into the area from the Northwest as early as 1540. Most sites date from about A.D. 800 to 1300 and were occupied by the Anasazi People who are believed to have been ancestors of modern Pueblo Indians.

Within the San Juan Division are the major and well-protected Anasazi

FLAG marks a proposed well site on Wild Horse Mesa 100 miles southeast of Farmington. Harland Gould and Charles Werner, Company employees, watch as John Keller prepares notes on environmental impact.

sites at Mesa Verde, Aztec and Chaco Canyon, as well as Salmon Ruin which is currently under excavation.

Today's increasing demand on the region's oil and natural gas reserves, however, exposes hundreds of the smaller, less known of these sites to potential disturbance.

A federal law passed in 1974 requires an archeological survey in advance of such activities before use permits are issued on federal and Indian lands. A similar procedure is required on state lands. The smallest percentage of land ownership in the Company's San Juan Division is private land upon which archeological surveys are not required by law.

Longtime Division employees recall that even before archeological surveys were required by law the Company made an effort to protect prehistoric sites encountered during well drilling and related activities.

Earl Mealer, project engineer in the Division, said museum archeologists from Santa Fe were called in by the Company as early as 1972. One of Mealer's responsibilities is to insure that the Company meets archeological clearance requirements.

Harland Gould, drilling field supervisor with more than 20 years of Company experience in the Division, recalled that when significant archeological evidence was encountered during Company operations, professional archeological assistance was sought long before it was required by law.

Both Company personnel and archeologists agree that the law has brought about more archeological field surveys within the Division.

"It's a great service to archeology," said San Juan County Museum Association Archeologist Nancy Hewett of Farmington. "It may be a big pain to a lot of people but it does have its benefits," she said.

The Company presently contracts with both the museum, located at the Salmon site just west of Bloomfield, and New Mexico State University through its San Juan Branch College in Farmington for all archeological surveys in the San Juan Division.

The museum's contract archeology

program has operated since September, 1974, under Department of Interior permits issued to Eastern New Mexico University at Portales. Contract work for El Paso and other companies in the region is also an important source of museum income. "It keeps the doors open," Mrs. Hewett said. "El Paso is contributing to the community in a very real way."

For the period since the museum's program began through October, 1976, museum records show inspection surveys were completed for 336 Company field localities in the San Juan Division. Museum survey work cost the Company \$5,880 for the period from September, 1975, through early November, 1976.

Conducting surveys for the museum, in addition to Mrs. Hewett, is museum archeologist Pat Zarnowski.

New Mexico State University archeologist Billy J. Naylor reports San Juan College completed 87 site surveys for the Company for the period

of January through November, 1976. The university's survey work in the Division also began in the Fall of 1974.

The history of federal laws intended to protect archeological sites dates back more than 70 years, beginning with the Antiquity Act of 1906 which established the basic principle of preserving the nation's historic and prehistoric resources.

A number of additional federal and state laws with similar intent were passed in succeeding years, but federal statutes often lacked effectiveness until 1974 when Congress amended the Reservoir Salvage Act of 1960 to require funding for protection of archeological resources endangered by programs authorized by any federal agency.

"Until then," Mrs. Hewett said, "there were just no teeth in the legislation."

Charles Werner, drilling technician in the San Juan Division, recalled that until about two years ago field operations required much less paperwork.



"It'd just be a matter of a phone call (to the U.S. Geological Survey office) and we'd go do it," he said. Once a road or well pad had been surveyed, road building and heavy equipment followed almost immediately.

Now, in addition to a stack of paperwork on each well, there is an average 30-day delay before final approval is granted from the various governmental agencies involved, Werner said. And new regulations could increase the de-

lay to as long as 90 days, he added. Delays are also caused when snow cover prevents an archeological survey.

But Werner does see value in the archeological surveys. The archeologist will "see something on the ground that we won't see because we're not archeologists," he said. Company crews and drilling contractors did not intentionally damage sites but it sometimes occurred, Werner said, because the men simply were not aware of the presence of subsurface ancient Indian dwellings.

Archeologists also admit they are sometimes made aware of sites by Company crews whose familiarity with land is the result of years of experience in the field.

Mrs. Hewett said her main concern is to preserve the site which, when discovered in New Mexico, is registered with the state's anthropology laboratory in Santa Fe for possible future excavation.

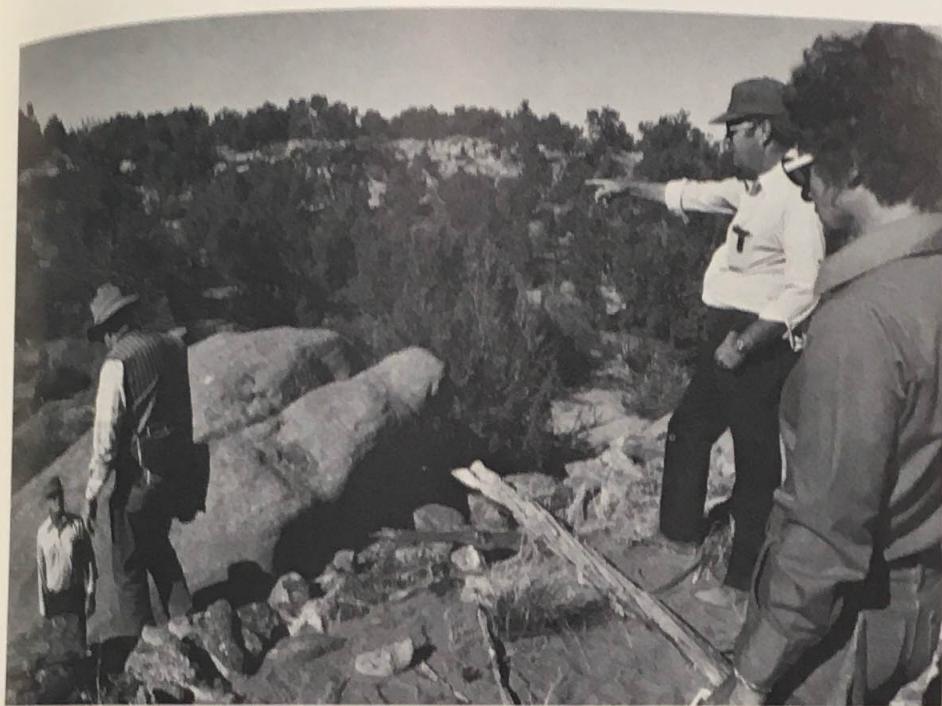
Salvage archeology is undertaken only when a site must be destroyed. "Salvage archeology usually has to be done in a hurry. And it's not done as well . . . when you have a bulldozer waiting in the wings, you just don't do as thorough a job," Mrs. Hewett said.

When salvage archeology is not undertaken the number of artifacts collected is limited and they are collected primarily for identification and preservation of whole artifacts, she explained. Such artifacts are stored at the museum and available for public inspection and site verification.

In many instances, a minor deviation in a road or well location is sufficient to protect any Indian sites located.

The archeologist does not have authority to halt Company projects, but his recommendations are given serious consideration by the government agency involved prior to granting the archeological clearance, Mrs. Hewett said.

Location of pottery sherds alone is not the objective of a field survey, Mrs. Hewett explained. "The museums are filled with pottery. The objective is to preserve the living sites. I wouldn't want them disturbed . . . I feel my job is to locate the living sites and to protect them."§



LEFT: Gould and Werner inspect a summer shelter site with Nancy Hewett, archeologist with the San Juan County Museum Association. The road to a proposed well site was realigned to avoid disturbance of the site. ABOVE and BELOW: The group examines rock outcrop.





GRADUATES and Personnel Administration employees are shown here after successful completion of a Company-sponsored Shorthand I course. Pictured are (seated, from left) Helene Morris, Sylvia Luna, Cathie Buffington and Rebecca Shep-

herd; (standing, from left) Johnny L. Hodges, J. M. Bonds, Maria Carbajal, Terry O. Jacques, Cecy Tercero and Larry Cano. Not shown were Josefina Vallejo, a student, and Mary Ann Ramos, instructor.

BRENDA MURRAY, daughter of Mr. and Mrs. Joe B. Murray of Jal, has been elected the 1977 president of Alpha Delta Pi Sorority at Texas Tech University. A junior majoring in advertising/mass communications, she maintains a 4.0 grade point average and has remained on the Dean's List each semester she has attended. Her father is a well test supervisor in the Production Department.



AIRMAN John W. Plant, son of Mr. and Mrs. Alfred M. Plant, has completed basic training and is now assigned to a telecommunications unit at Minot Air Force Base in North Dakota. John's father and mother live at Salt Flat, where Alfred works at Guadalupe Station.

RECENTLY RETIRED



JAMES D. ADEN; Permian Division; Engineering—Jal; August 1976/19 years.



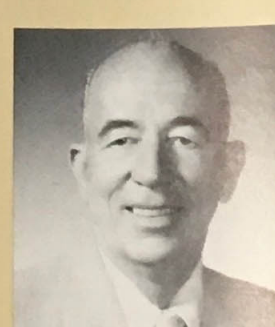
CHARLES H. FOUST; Southern Division; Tucson M/L District; December 1976/31 years.



BEVERLY A. GARDNER; Rate Department; Main Office; November 1976/8 years.



JOHN R. McCALL; Permian Division; Pembroke Station; December 1976/30 years.



JOHN C. SPARLING; Permian Division; Warehouse—Jal; December 1976/37 years.

ple



THE GREEN GIRLS of Coya-nosa, daughters of Mr. and Mrs. Clifford Green, have received honors at Buena Vista school. Linda, (top left) a sophomore, was crowned Homecoming Queen during the football season and Melisa, an eighth-grader, was chosen Halloween Princess. Their father is a plant operator at Waha Plant.



EL PASO City Champs in minor league play (ages 8 to 10) ended this past season with a 20-4 record. Pictured in "Banner's Brigade" are (bottom row, from left) George Gimler and Cesar Boisselier, bat boys; Joe Kautz, Chip Harries, Brian Kiser, Trey Gimler, Joel Marr, Orlando Zubia, Carlos Boisselier

and Teddy Goldean, bat boy; (second row, from left) Hank Powell, Louie Zubia, Eli Eastman, Willie Kautz, Fernie Salcido, Speedy Gonzalez, David Martinez, Paul Goldean, and John Peterson. Coaches included (from left) Bob Kautz and Jim Gimler shown with sponsor Ralph Banner.



THE HEISMAN Trophy for 1989 is already spoken for, thank you. Bobby Cortez, 9, (right) led the Eastwood Raiders to the 1976 Minor Division Football City Championship with a 14-0-1 record by scoring 25 touchdowns and five extra points. (He was also captain of the defensive unit that allowed only 24 points in 15 games). His brother, Rudy, too young at age 7 to participate, was equipment manager. They are the sons of Robert Cortez, senior programmer, Corporate Systems Development Department



TWO JAL High School seniors, Judy Woods and Dianna Hogg, came up winners recently in the District "Make-It-Yourself With Wool" Contest. Judy (right), the daughter of Mr. and Mrs. Don L. Woods, won first runner up. Dianna, daughter of Mr. and Mrs. Carl D. Hogg, won second alternate. Don works as a welder and Carl in measurement at Jal.



GEORGE WINKLEY; Permian Division; Santa Rosa Plant; December 1976/32 years.

IN MEMORIAM

MIRAL D. BOND; November 3, 1976; 24 Years' Service; San Juan Division; E/M San Juan River Plant.

E. L. BOSTICK (Retired); November 24, 1976; Permian Division; Jal No. 3 Plant.

ROBERT E. HOLT JR. (Retired); October 23, 1976; Permian Division; Measurement; Spraberry.

JOHN V. KNIGHT; November 22, 1976; Permian Division; Engineering; Jal.

CECIL McLEOD (Retired); November 30, 1976; Southern Division; Guadalupe Station.

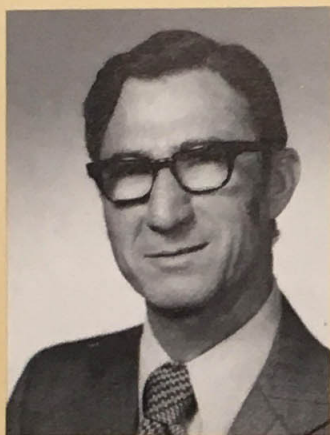
W. E. MITCHELL; November 29, 1976; Southern Division; El Paso Mainline District.

MYRTLE A. STOWE (Retired); November 16, 1976; Administrative Services/Office Services/PBX; Main Office.

MOVING UP

All promotions mentioned in this section represent only those employees upgraded from non-exempt to exempt positions.

4



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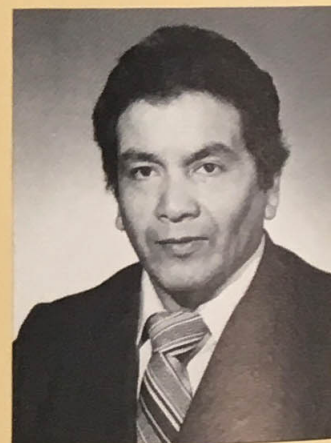


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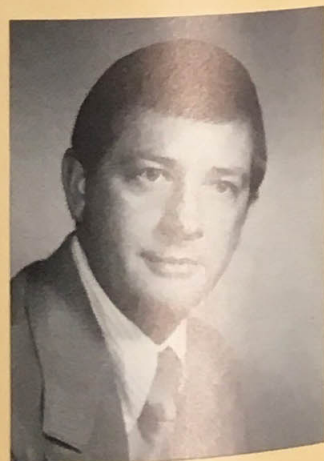
(4) IRA C. GRIFFITH has been promoted from clerk in the San Juan Division Accounting Department to supervisor in the same department. He began as a clerk in Pipeline Construction in 1952.

7



(5) PATSY A. LESLEY has been promoted from clerk to office services supervisor for the El Paso LNG Company. She joined El Paso in 1973 as a clerk in the Personnel Administration Department.

8



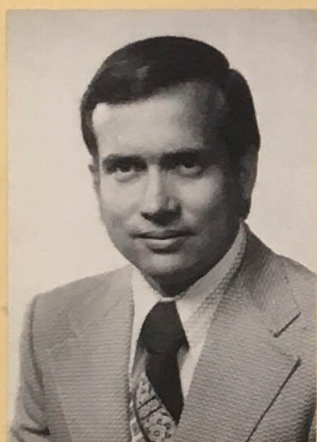
(7) ALVINO MUNOZ has been promoted from technician in the Office Equipment section of the General Office Services Department to section warehouse supervisor in the same department. He joined El Paso as a junior clerk in 1962 in the Administrative Services Department.

(8) THOMAS J. WILSON has been promoted from junior analyst in the San Juan Division Personnel Administration Department to personnel representative in the same department. He began his career with the Company as a laborer at Blanco Plant in 1965.

(1) RICHARD W. CASTER has been promoted from accountant to senior accountant in the General Accounting Division of the Controller's Department. He started with El Paso in 1969 as a clerk in the same department.

(2) MARIAN B. DAVIS has been promoted from clerk to rental analyst in the Energy Resource Development section of the Land Department. She began with the Company in 1960 as a stenographer in Advertising and Publicity.

(3) ROBERT F. GOODDING has been promoted from clerk to supervisor in the San Juan Division's Budget and Cost Control Department. He joined El Paso in 1956 as a clerk in the same department.

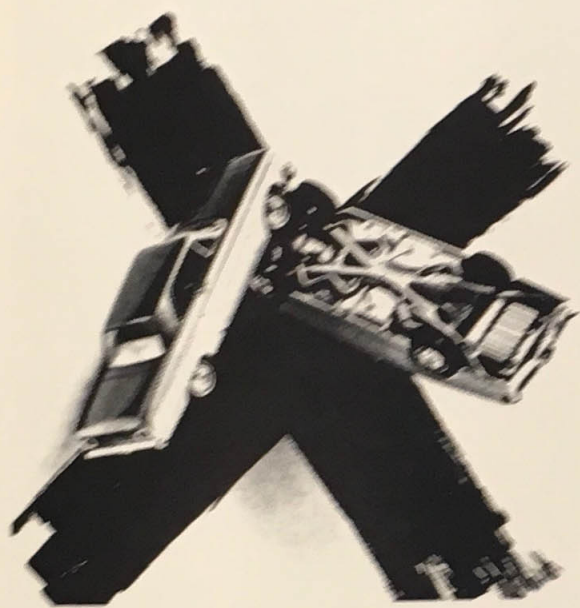


2



3





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OBSCENE PROFITS?

Out of the total income arising from corporate operations in 1974, more than 84 percent was paid out to compensate employees. The share paid to stockholders in the form of dividends was approximately one-twentieth of the total. According to the United States Department of Commerce, Survey of Current Business, April, 1975, distribution of income originating in American corporate business was as follows:

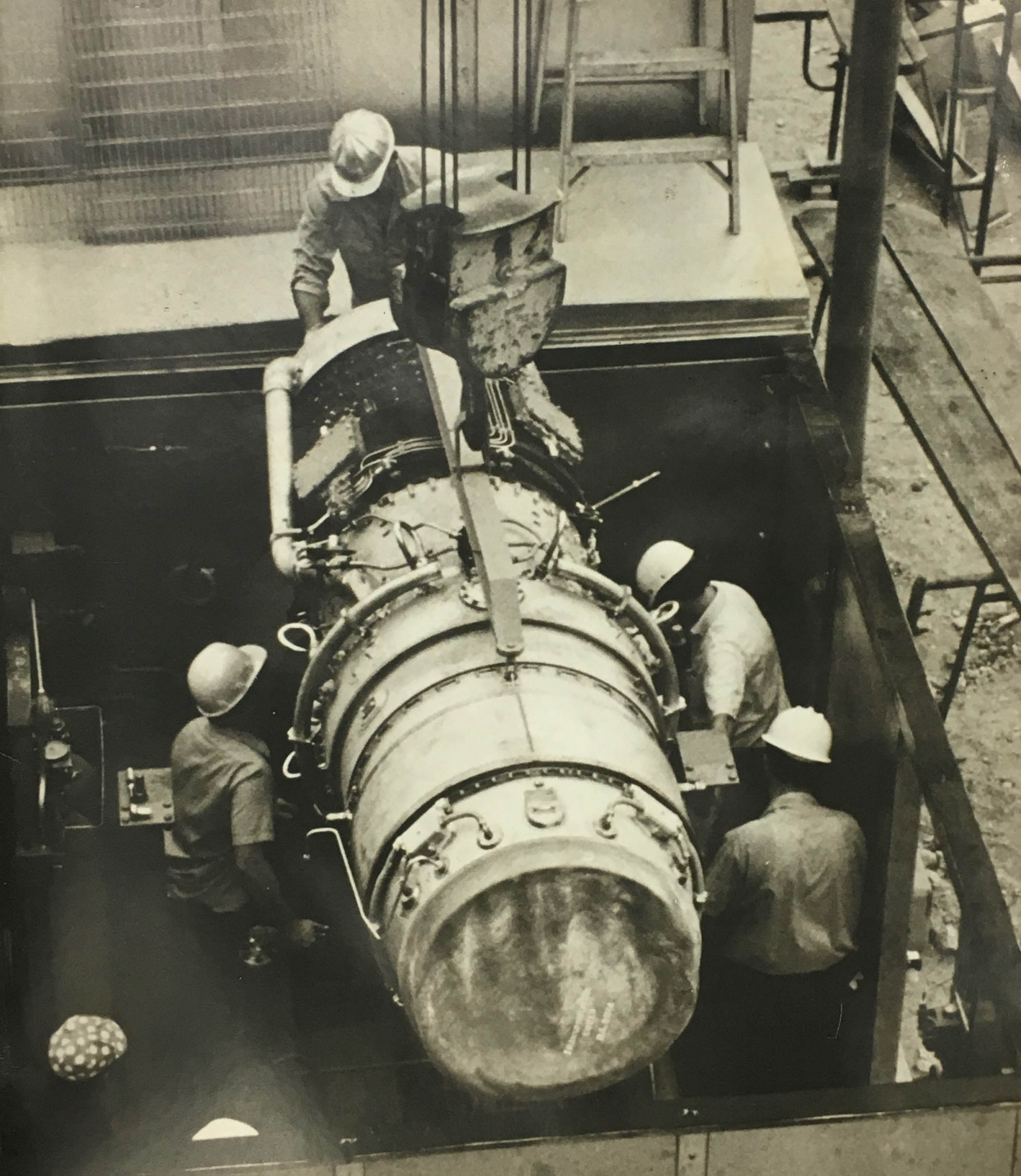
1974

	Billions of Dollars	Percent of Total
Compensation of employees*	\$524.1	84.1%
Net interest	3.2	0.5
Corporate profits		
Profits before tax	130.8	21.0
Tax liability	55.7	8.9
Profits after tax	75.1	12.1
Dividends	33.4	5.4
Retained profits	41.8	6.7
Inventory valuation adjustment**	-35.1	-5.6
Total income originating in corporate business	623.0	100.0%

*Wages and fringe benefits

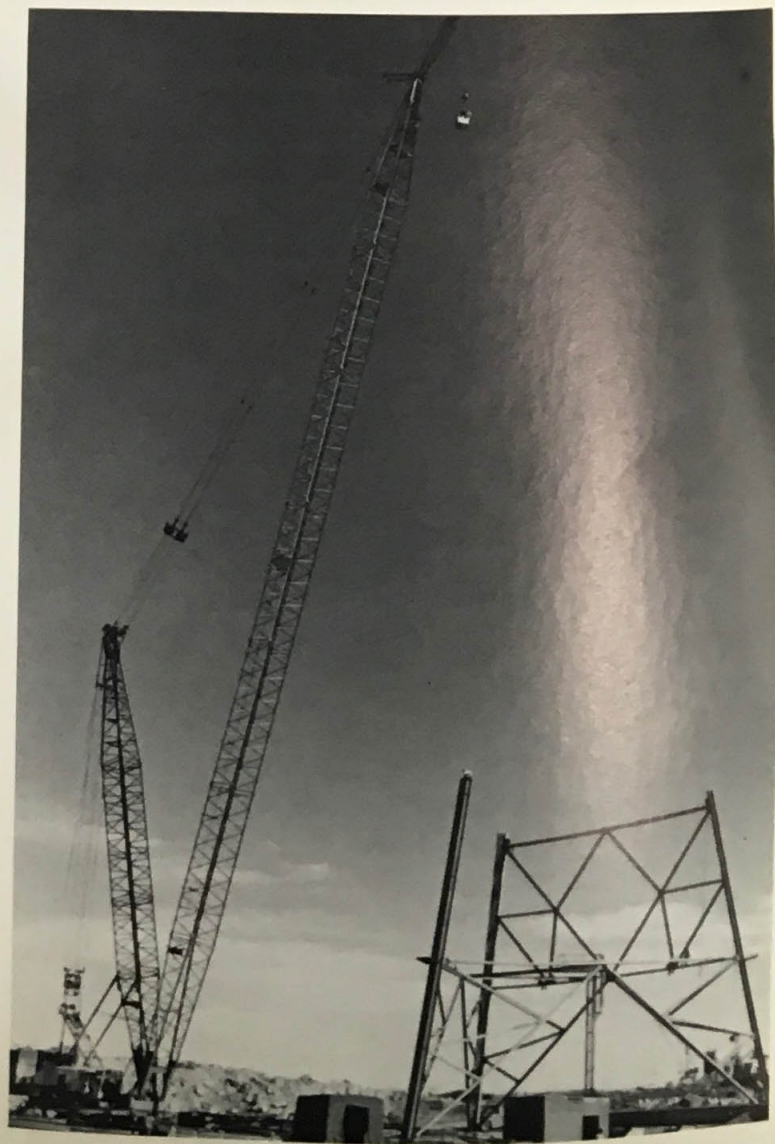
**Adjustment applied by Commerce Department to eliminate inventory profits.

WHO SAID OBSCENE?



the Pipeliner

EL PASO COMPANY AND SUBSIDIARIES FEBRUARY 1977



◁ VIEW FROM the crane can be exhilarating, as Cliff Trussell discovered on a recent photographic visit to Algeria to picture construction of the LNG liquefaction plant at Bethioua near Arzew. Top left, and continuing clockwise, the lift begins, he's almost there, view from bottom to top and from top to bottom (100 meters).

the Pipeliner®

FEBRUARY 1977 VOLUME 40 • NO. 1

On The Cover

WOULDN'T SAY QUIT attitude on the part of an engineering group at El Paso Products' Butadiene Plant, resulted in considerable savings in fuel and maintenance costs with the installation of jet engines used to regenerate catalyst. Story beginning on page 9 gives some of the details involved in this installation.



COMPANY AND
SUBSIDIARIES

P.O. BOX 1492

EL PASO, TEXAS 79978

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Gary Bilodeau, Staff Assistant

Lydia Boureslan, Secretary

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2 The Silent Killer Stalks Us All

How some El Paso employees are facing up to the mental and physical stress of heart disease.

8 Test Shows Susceptibility To Illness

Read the stress-producing incident, check the applicable line and add up your score.

9 Costs Drop Dramatically With Jet Installations

The Butadiene Plant at El Paso Products Company in Odessa boasts an installation unique on the North American continent.

13 Six Afloat & Three to Go

The *El Paso Cove Point* becomes the sixth ship launched in the Company's growing fleet of LNG carriers.

14 Growing Your Own

The family tree influences us all, and particularly Dan Brennan, who has done a lot of digging since retirement.

18 Turns Sandstone To Sculpture

Johnny Vigil "whittles" in unusual material, creating sculpture in the process.

20 Pennies From Denver

Minting pennies is no penny-ante business.

24 Algerian Adventure

What's it like to spend a month in Algeria?
Ken Corder and Chuck Dellert report.

27 Contract Archeology

San Juan Division employees and El Paso Natural contribute time and money toward better understanding of prehistoric Indians.

30 People Recently Retired In Memoriam

32 Moving Up

The Silent Killer Stalks Us All

W. E. "BILL" WINFIELD is 53 years old. Four years ago he suffered his first heart attack.

"I was working the night shift at Leupp Compressor Station. There were other men in the plant, but I was alone in the control room," he recalled. I'd been having discomfort all evening,

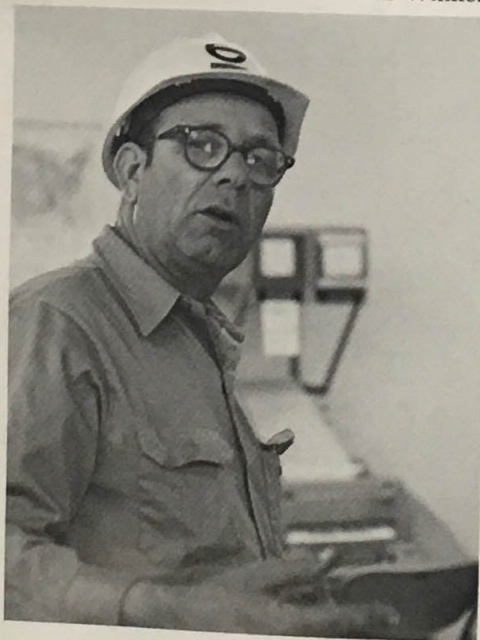
but I figured it was just indigestion.

"Suddenly, pains were shooting down both my arms. It was so bad, I wanted to pull my arms off. I got to the phone and called Hugh Graves, who was the supervisor. He came right over, put me on oxygen and took me to the hospital where I was in intensive care for three days."

Seven months later Bill had another attack. This time he was out of work for three months. Surgery was suggested, but Bill chose to curtail some of his activity and rely on medication.

"It's a frightening thing to think of having heart surgery," he said. "You hear all kinds of wild stories — or at least, I did."

Bill Winfield



*"You're sitting on a
keg of dynamite, Bill."*

HUGH F. STEEN HEADS HOUSTON HEART DRIVE

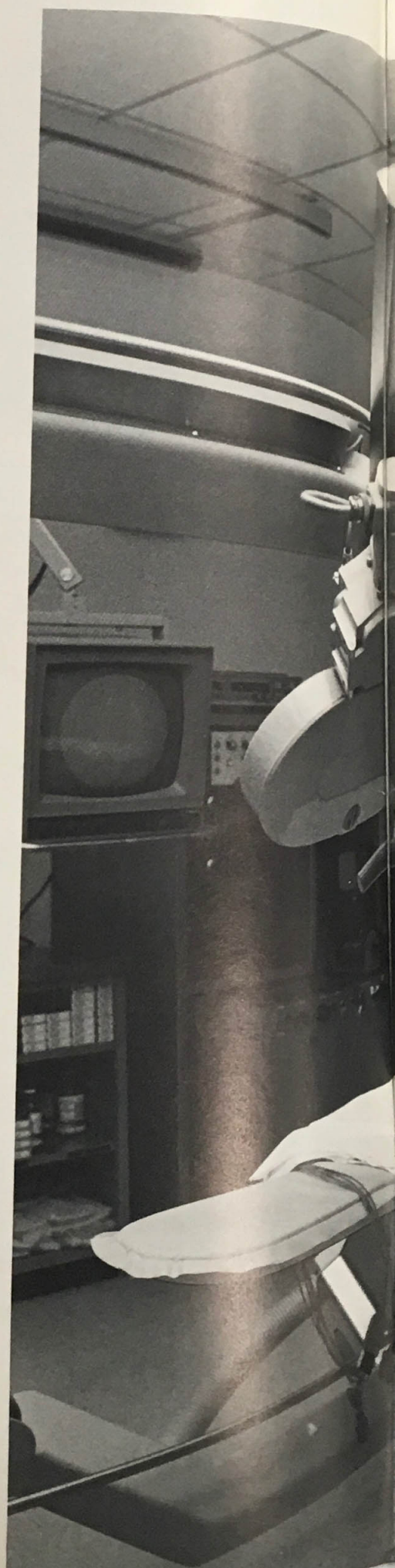
Hugh F. Steen, president of the El Paso Company, has accepted the chairmanship for the 1977 Heart Fund campaign in Houston. The



Heart Drive is annually held during the month of February.

As head of the Houston campaign, Mr. Steen will coordinate the efforts of 20,000 community volunteers who will visit business and residential areas to distribute heart-saving information and collect funds to support research, educational programs, and community service projects sponsored by the American Heart Association, Houston Chapter.

In accepting the appointment, Mr. Steen noted that heart disease is the number one killer in the United States. He said that "close to a million Americans will die from some form of cardiovascular disease this year or about the same number of people in a city the size of Houston."





"But when I began having more pains, I knew that surgery was necessary. So I went to Good Samaritan Hospital in Phoenix for tests."

One of the tests taken by Dr. Alberto Benchimol, head of the Cardiac Institute at Good Sam Hospital, was cardiac catheterization. A thin, flexible tube was inserted into an artery and guided to the heart. During this test, a special fluid is released, which shows up on X-ray, and a series of X-ray pictures traces the flow of the liquid, visualizing the internal condition of the heart and arteries on a TV monitor.

"The TV screen was set up where I could see it," Bill said. "After two days of tests, I was discharged. But before I even reached home, the doctor called."

"When I returned his call, he said, 'You're sitting on a keg of dynamite, Bill. The fuse isn't lit yet, but I suggest you turn around and come back in for surgery.'"

In February 1974, Bill was admitted for heart surgery which was performed by Dr. Lee Brown. Eleven days later he was back home. In six weeks he was back at work. Today he is chief plant maintenance mechanic at Leupp Station in Arizona.

Bill Winfield is one of a growing number of people who've had their



HEART ATTACK victim Howard Duscha, Systems & Computer Services in El Paso, is filled in on exactly what happened during the attack by Gary Tague, St. Joseph's Rehabilitation Center. The machine (left), used in cardiac catheterization tests, transmits a picture of the conditions existing inside the heart and coronary arteries to the television screen.

"You don't have to have a heart attack before you undergo heart surgery."

lives saved by medical advances in treating Cardiovascular Diseases (CVD). These advances have been made in just the past couple of decades. In spite of tremendous strides forward, however, heart disease still ranks as the number one killer in the U.S.

Many thousands of these deaths occur among people in their most productive years. CVD strikes men and women in responsible jobs at a time when they still have children in school and mortgage and car payments to make.

CVD has risen to tragic prominence when many Americans are enjoying prosperity and its accompanying "good life." The American Heart Association estimates that heart and vascular diseases cost some \$22.7 billion annually, and that nearly 29 million Americans have some form of heart and/or blood vessel disease.

It is a fact that 684,066 deaths in 1973 were due to heart attack and it is estimated that at least the same number of persons died in 1976 from the same cause.

It is also a fact that some people are suffering one or more symptoms of CVD and are unaware of it.

Henry Dundas is tall and thin; a patient man with a slow, warm smile. He is, and always has been, interested in sports and the outdoors. Golf, tennis and camping with his active family were among his favorite activities.

His job as coordinator for the Southern Division of El Paso Natural Gas Company was a satisfying one.

"For about a year I felt bad," he recalled. "I tired easily and was short of breath. But I never had any pain.

"Then I came down with what I thought was the flu. It dragged on for nearly three months. Then I began experiencing pain on both sides of my throat and up under my jaws.

"I felt so rotten one day that I decided to see the Company doctor. He suspected heart trouble immediately, and scheduled a stress test for me. It only took 30 seconds on that treadmill to confirm his suspicions."

Within 24 hours of having an angiogram test, Henry was in Houston, in surgery. Using sections of the saphenous vein removed from Henry's leg, the cardiac surgical team implanted

four bypasses from the aorta to the heart to replace the occluded, or blocked, arteries.

During surgery Henry suffered his first cardiac infarction — heart attack.

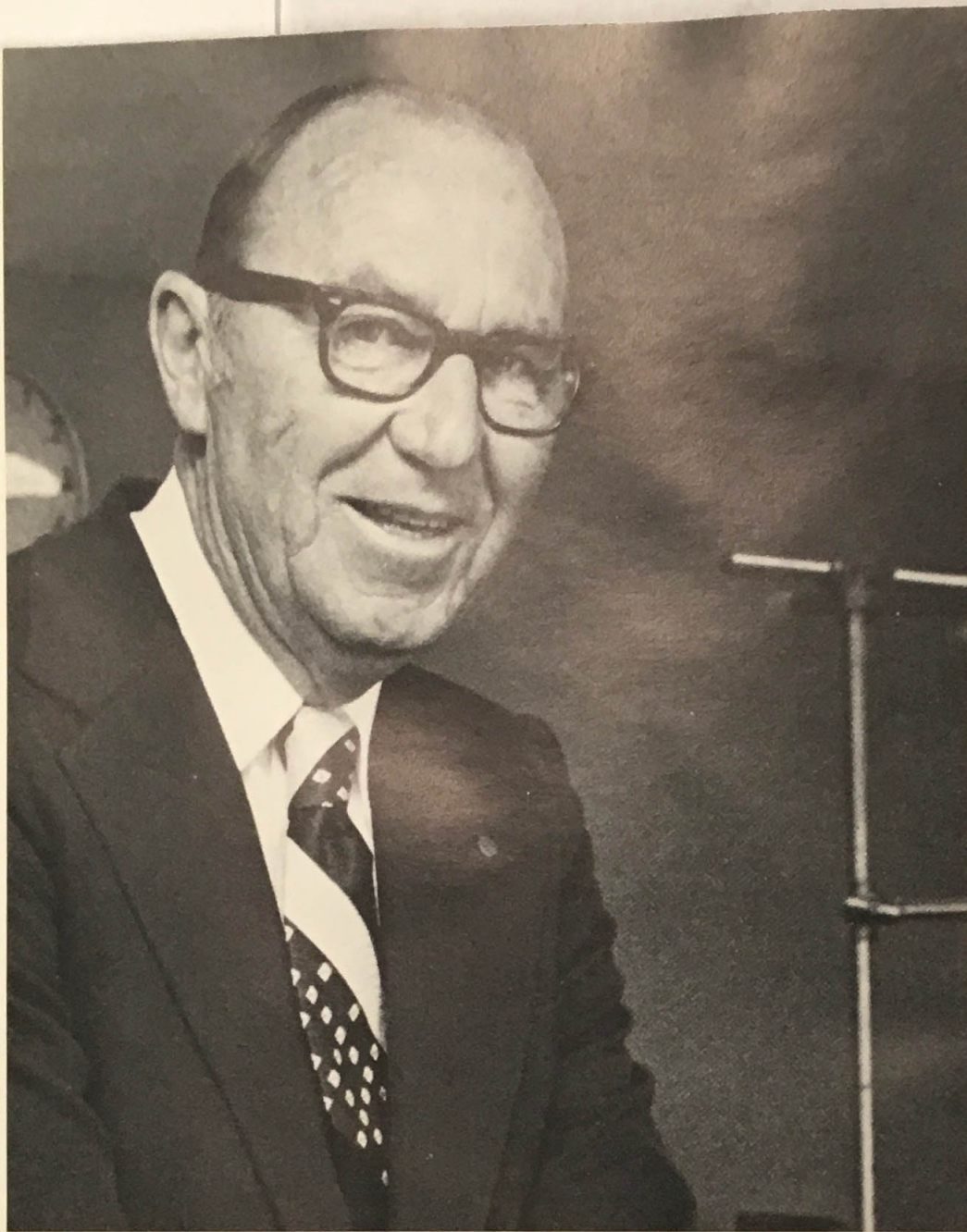
"I didn't know anything about it, of course," he said, "until after I awakened from the anesthetic. I spent 12 days in the hospital, recovering."

The day after he returned home to complete his recuperation, Henry had his second heart attack. Seven months later, in September 1975, he repeated his visit to surgery.

Henry Dundas



"It was either continue as an invalid or have the operation."



Bud Lassiter

"This time the surgery was performed in El Paso," he said. "I was a little more apprehensive than I was the first time, but I'm a realist. It was either continue as an invalid, or have the operation."

Neither Henry nor Bill was what most people consider prime heart attack candidates. Both were physically active; neither was overweight.

The Heart Association says that a man's chances of having a heart attack before age 65 are between one in twenty and one in fifty, IF he has normal weight, normal blood pressure, average or low levels of blood cholesterol, no diabetes, is not a heavy cigarette smoker, is moderately active, has a normal cardiogram, and has no damage to his kidneys or thyroid gland.

The heart is the sturdiest, toughest muscle in the body, and was designed to carry on its vital activity day in, day

out, year in and year out, without conscious effort.

But modern living conspires to interfere with its precise, dependable activity. Cigarette smoking, high blood pressure, lack of exercise, hereditary factors, improper eating habits, and tensions and stresses cause a kind of biological rust in the coronary arteries which supply life-sustaining blood to the heart itself.

This condition is known as arteriosclerosis. Deposits of fatty material and calcium called "plaque" narrow the arteries and roughen their normally smooth lining. These plaques cause cells in the artery walls to break down, irritating tissues and causing scars. Over a 20- to 30-year period, plaque build-up reduces the heart's blood supply causing a pain known as "angina pectoris."

"You don't have to have a heart attack before you undergo heart sur-

gery," explained N. D. "Bud" Lassiter Jr., employment administrator for El Paso Natural Gas Company.

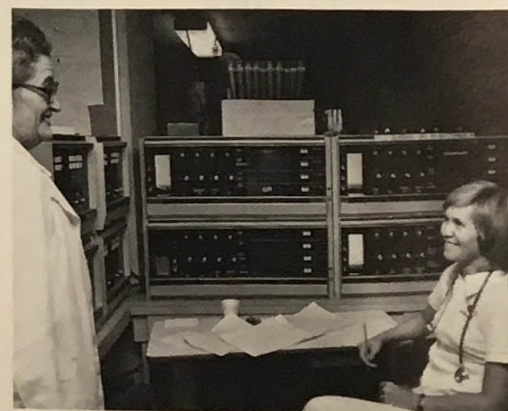
"I had suffered from angina pectoris for about three and a half years," he said. "I thought maybe it was indigestion or a hiatal hernia, since I didn't have a history of high blood pressure and my cholesterol levels were normal.

"But any increased or sudden activity produced pain. So I began to live within a narrowing activity range, and I made sure I had nitroglycerin tablets with me at all times."

Eventually, Bud took a stress test, and then had an angiogram. The tests showed that two coronary arteries were blocked—one 70 percent and the other 90 percent.

"I was given certain options," Bud related. "With surgery before a heart attack, I could be assured of a 98 percent complete recovery chance. Without surgery, there was a 50/50 chance that I would have a major heart attack within six to eighteen months, with a 50/50 chance of survival. If I survived and then had surgery, recovery chances dropped to 60-70 percent.

"There seems to be this one thing in common with heart doctors," Bud said, "they're anxious for you to understand completely what your situation is. They explain everything in detail as many times as necessary in



PATIENT'S PROGRESS can be monitored at this location, no matter where patient is in the Cardiac Care Unit ward. At left is Mrs. Evelyn Balginy, director of nursing, and Sandy Earles, head nurse.

order for you to have a complete picture of what is taking place—or about to take place. I've found them to be totally honest with the patient."

Bud underwent surgery in January 1975. About six weeks later he was back at work. He is not restricted in his activities, and does not have to adhere to a special diet.

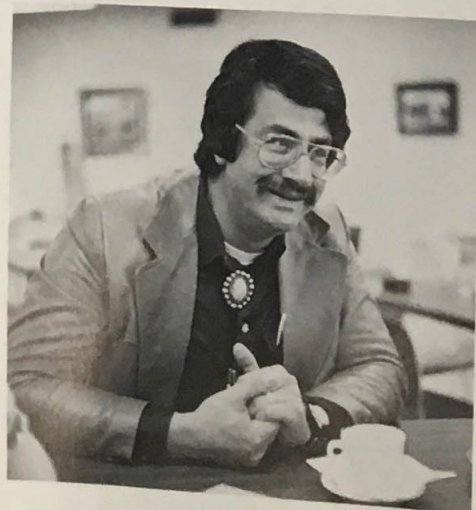
"I am conscious of the importance of regular exercise," he said, "and also of eating properly. And I don't smoke. I know for sure that recovery is enhanced if you have surgery before your first heart attack."

Dr. Alejandro Duran Jr., on the staff of St. Joseph Hospital's Cardiac Rehabilitation Center in El Paso, Texas explained that there are four major precipitating factors for heart attacks. They are: stress, elevated blood pressure, elevated serum cholesterol (dietary or metabolic), and smoking one or more packages of cigarettes a day.

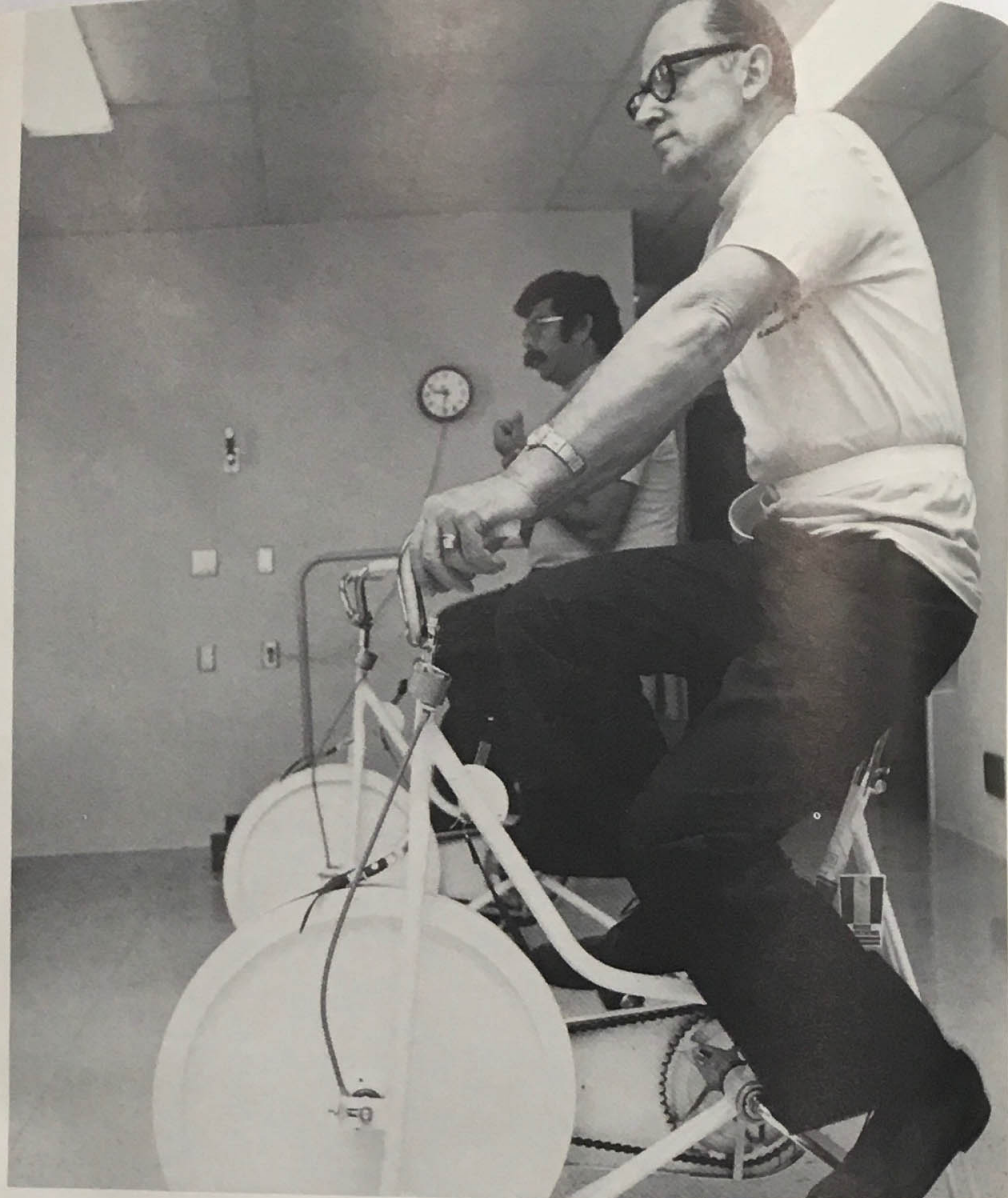
Nearly everyone is familiar with the dangers of the last three factors. But in recent years, more attention has been paid to the eventual price that more-than-normal amounts of stress exact.

"Man was designed to live in an unstressed state," Dr. Duran said. "That means being happy and living in harmony with one's environment."

"If you have to face stress on a daily basis, your body goes into an emergency or lifesaving reaction. It's actually a 'fight or flight' type of reaction



DR. ALEJANDRO DURAN feels man was designed to live in an unstressed state.



HOWARD DUSCHA pedals to a clock during his first day's exercise period. A

monitor on his belt relays information concerning his heart rate to a technician.

where adrenalin is released into your system, triggering the following body reactions:

1. Rapid heartbeat (tachycardia).
2. Increased visual acuity.
3. Increased blood circulation to the brain. (These three reactions are the reason you function better under stress).
4. Increased circulation to arms and legs (for flight or fight).
5. Less circulation to the gut.
6. Increased muscle tone in abdominal muscles.
7. Increased secretion of hydrochloric acid to stomach (resulting in abdominal pain or spasms, or peptic ulcer disease).
8. Elevated blood pressure.
9. Elevation of serum cholesterol.

"These reactions were meant to literally save your life in occasional emergency situations, not to be used on a daily basis," he said.

The emotions that trigger the adren-

alin — or stress — reaction are fear, anger, hate, resentment, unforgiveness, fatigue (either physical or mental), or mental depression. And few can argue the fact that nearly everyone faces these stresses daily.

"There's one other bit of bad news that stress causes," Dr. Duran said. "Overproduction of adrenalin gives the heart an irregular rhythm which, if it continues for just four consecutive heartbeats, will be fatal within four minutes if it is not stopped."

"We're all familiar with such incidents. A person becomes enraged over some situation, and dies within minutes. The sudden flood of adrenalin to the heart caused an irritable heart rhythm called premature ventricular contractions, with fatal consequences."

Stressful incidents may cause different reactions in certain individuals, however. Research efforts have uncovered the fact that many diseases are the result of stress. How a person is

affected depends on individual personality plus hereditary factors. These are called "end-organ responses."

In other words, sudden anger may trigger a heart attack in one person, but another will have an asthma attack. Someone else will develop bleeding ulcers. Acute pancreatitis (a severe inflammation of the pancreas gland which interferes with the normal production of insulin), neurodermatitis (commonly called hives), acute colitis (inflammation of the colon), and sudden overactivity of the thyroid gland, which if untreated, can cause death within an hour, are all a result of stress.

What can you do to protect yourself?

"Since nicotine gives all the adrenalin reactions noted previously, one obvious solution would be to stop smoking cigarettes," Dr. Duran said.

"Then, in addition to proper diet and exercise, learn to overcome or cope with stressful situations. For example, if you're afraid to talk in front of a group, take a public speaking course. Many people have found various forms of meditation to be extremely helpful in facing and eliminating many of the day to day stresses encountered in jobs and family life."

As part of the rehabilitation program at St. Joseph's Cardiac Rehabilitation Center, patients are encouraged to read *THE RELAXATION RESPONSE* by Herbert Benson, M.D.

As research continues into how stress affects our lives for good or bad, one thing seems to stand out: everyone has his individual stress level. What bothers one person excessively may not even ruffle another. A racing thoroughbred would find it just as stressful to be confined under a yoke with an oxen, as that ox would be if he were shoved up to the starting gate with expectations of competing with racehorses. Some are born to pull, some to run.

According to Gary Tague, administrative director at St. Joseph's Cardiac Center, cardiac rehabilitation is such a new field that there are only two schools in the United States actually

teaching it. The rehabilitation program at St. Joseph's includes diet, exercise and personal counseling for patients—who must be referred by a doctor—and their families.

"Of all the persons completing our program, which is now more than a year old, not one person has had a subsequent heart attack," Tague said.

But for those patients already facing the prospect of heart surgery, the Heart and Vascular Center of the Southwest at Sun Towers Hospital has a free brochure which outlines what happens to a patient from the time the diagnosis is made until discharge.

Mrs. Evelyn Balginy, director of nursing, said, "Preparation is necessary to allay the fears that every person facing heart surgery experiences. We actually refer to the period of explaining everything to a patient, as pre-operative teaching.

"The cardiology staff is completely patient-oriented. We'll explain and demonstrate where possible, every step that will be taken as many times as is necessary to reassure both the patient and his family. The wonderful thing is that many former patients have volunteered their time to visit both patient and family. It really helps to have someone say, 'Look, it happened to me three days ago, and I'm up and around.'"

Dr. John E. Liddicoat, cardiovascular surgeon, and his team, along with Drs. Harvey Seidenstein and G. J. Di Donna, cardiologists, have perfected heart bypass surgery to the point where the time required for surgery



MRS. PAT ZIMMERMAN, regional director of the El Paso Heart Association, believes educational efforts are vital if incidents of heart disease are to be reduced.

has dropped from seven to less than three hours, on the average.

Sun Towers Hospital opened its Heart and Vascular Center in August 1975. One year later, nearly 150 people gathered to celebrate its first anniversary. Many of those in attendance were former heart patients, some of whom owed their lives to having had heart surgery.

The El Paso Heart Association sponsors a "Mended Hearts Club." Its 45 charter members, including Bud Lassiter, have all had open heart surgery and are back at their jobs.

These individuals give talks to organizations as well as on a personal basis, for those facing open heart surgery. Personal counsel and support to patients and their families includes staying with them during the period of surgery.

Mrs. Pat Zimmerman, regional director of the El Paso Heart Association, said, "Heart disease is still the number one killer. That's a position we don't want, so we're doing everything we can to change it.

"But change can only come through people being educated in how to take care of themselves to prevent heart disease. We're making efforts to begin this training with students in school. To make them aware of the necessity of good nutrition and a lifelong exercise program, we've been demonstrating CPR (cardio-pulmonary resuscitation) to all children in grades four through eight. In high school, we are teaching the actual techniques in their health classes. When they have successfully completed the program, these youngsters will be certified to administer this lifesaving technique."

The Heart Association is willing to train groups of seven or more people in CPR. It usually takes three to four hours, and consists of a film, demonstration, practice and test. Those successfully passing the test will be certified. Anyone interested may contact the local Heart Association.

It's never too late to begin a lifestyle that will enhance your chances to outwit the number one killer disease—heart attack. §

TEST SHOWS SUSCEPTIBILITY TO ILLNESS

IF YOU WOULD LIKE to know how susceptible you are to disease, here's a quick way to find out.

At the University of Washington Medical School in Seattle, Drs. Thomas H. Holmes and Richard H. Rahe devised a "Social Readjustment Rating Scale" test, which lists 42 common life changes in the order in which they found them to be of importance as forerunners of illness.

Oddly enough, an outstanding personal achievement can often lead to disease. When Astronaut Edwin "Buzz" Aldrin Jr., the second man on the moon, returned to earth, he committed himself to a psychiatric hospital. He said: "None of us knew how to handle it."

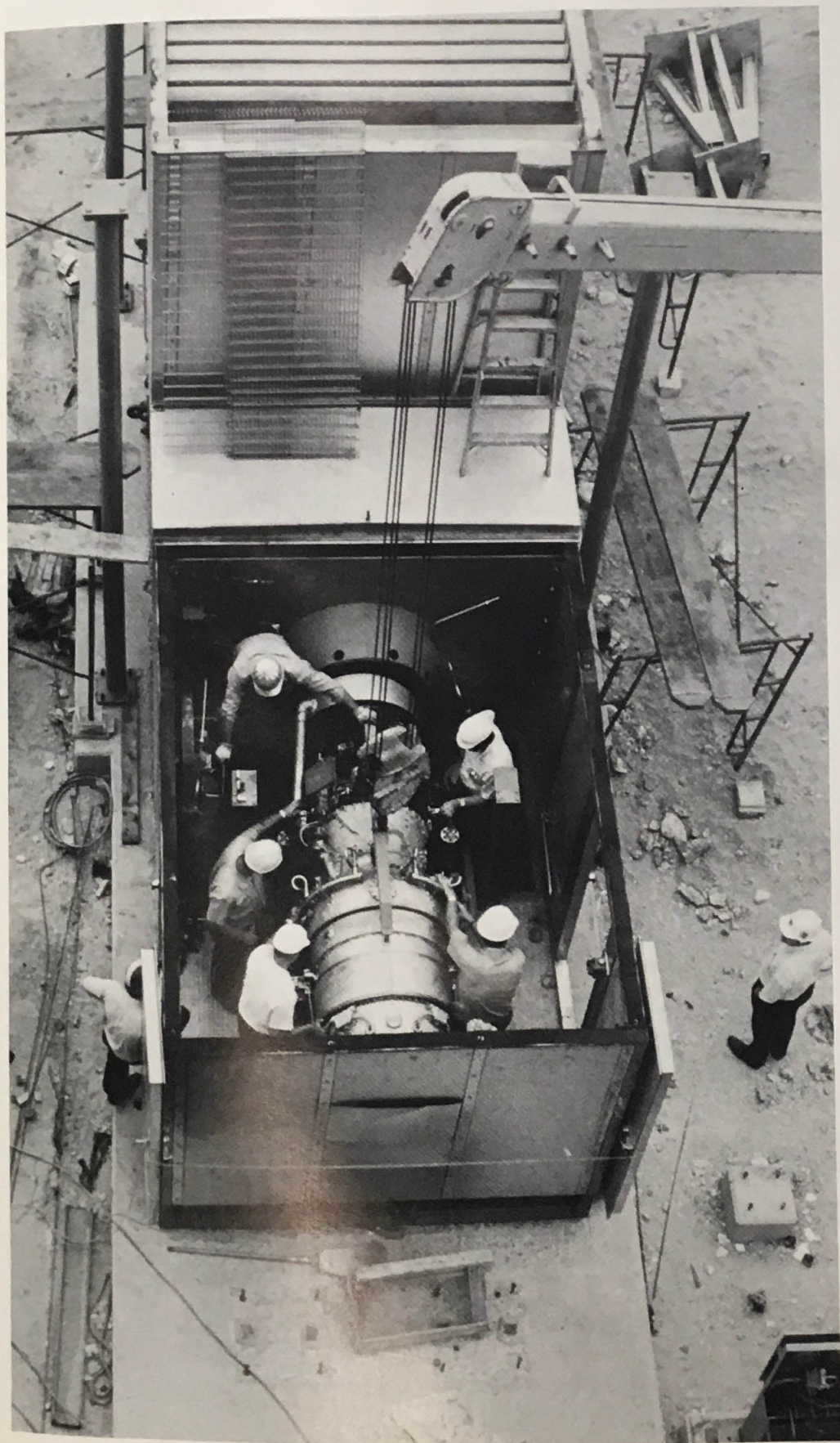
The test is widely used now, especially in the armed forces, to determine how susceptible you are to a disease. If you have a score of less than 150 within a period of a year, you have only a 37 percent chance of getting sick within the next two years. Should your score be between 150 and 300, your chances of an illness increase to 51 percent. But if you score over 300, you are in serious danger, for the odds are 80 percent that you will have sickness within the next two years.

Dr. Holmes, a man with a wry sense of humor, says, "If you have more than 300 life-change stress producing units and get sick, the probability is you will have cancer, a heart attack or manic-depressive psychosis rather than warts and menstrual irregularities.

"On the other hand," he adds, "there are worse things in this life than illness. It is worse to go on in an intolerable, dull or demeaning situation."

STRESS PRODUCING INCIDENT	POINTS	YOUR SCORE	
1. Death of spouse	100	—	22. Change in work responsibilities 29 —
2. Divorce	73	—	23. Son or daughter leaving home 29 —
3. Marital separation	65	—	24. Trouble with in-laws 29 —
4. Jail term	63	—	25. Outstanding personal achievement 28 —
5. Death of close family member	63	—	26. Wife begins or stops work 26 —
6. Personal injury or illness	53	—	27. Begin or end school 26 —
7. Marriage	50	—	28. Change in living conditions 25 —
8. Fired at work	47	—	29. Revision of personal habits 24 —
9. Marital reconciliation	45	—	30. Trouble with boss 23 —
10. Retirement	45	—	31. Change in work hours, conditions 20 —
11. Changes in family members' health	44	—	32. Change in residence 20 —
12. Pregnancy	40	—	33. Change in schools 20 —
13. Sex difficulties	39	—	34. Change in recreation 19 —
14. Gain of new family member	39	—	35. Change in church activities 19 —
15. Business readjustment	39	—	36. Change in social activities 18 —
16. Change in financial state	38	—	37. Mortgage or loan under \$10,000 17 —
17. Death of close friend	37	—	38. Change in sleeping habits 16 —
18. Change to different line of work	36	—	39. Change in number of family get-togethers 15 —
19. Change in number of arguments with spouse	35	—	40. Change in eating habits 15 —
20. Mortgage over \$10,000	31	—	41. Vacation 13 —
21. Foreclosure of mortgage or loan	30	—	42. Minor violations of law 11 —
			TOTAL —

At El Paso Products' Butadiene Plant ***COSTS DROP DRAMATICALLY WITH JET INSTALLATIONS***



THE BUTADIENE PLANT at El Paso Products Company at Odessa, Texas, is designed to produce 94,000 tons of butadiene annually. It utilizes the hot air exhaust from two jet aircraft engines to regenerate catalyst used in the process.

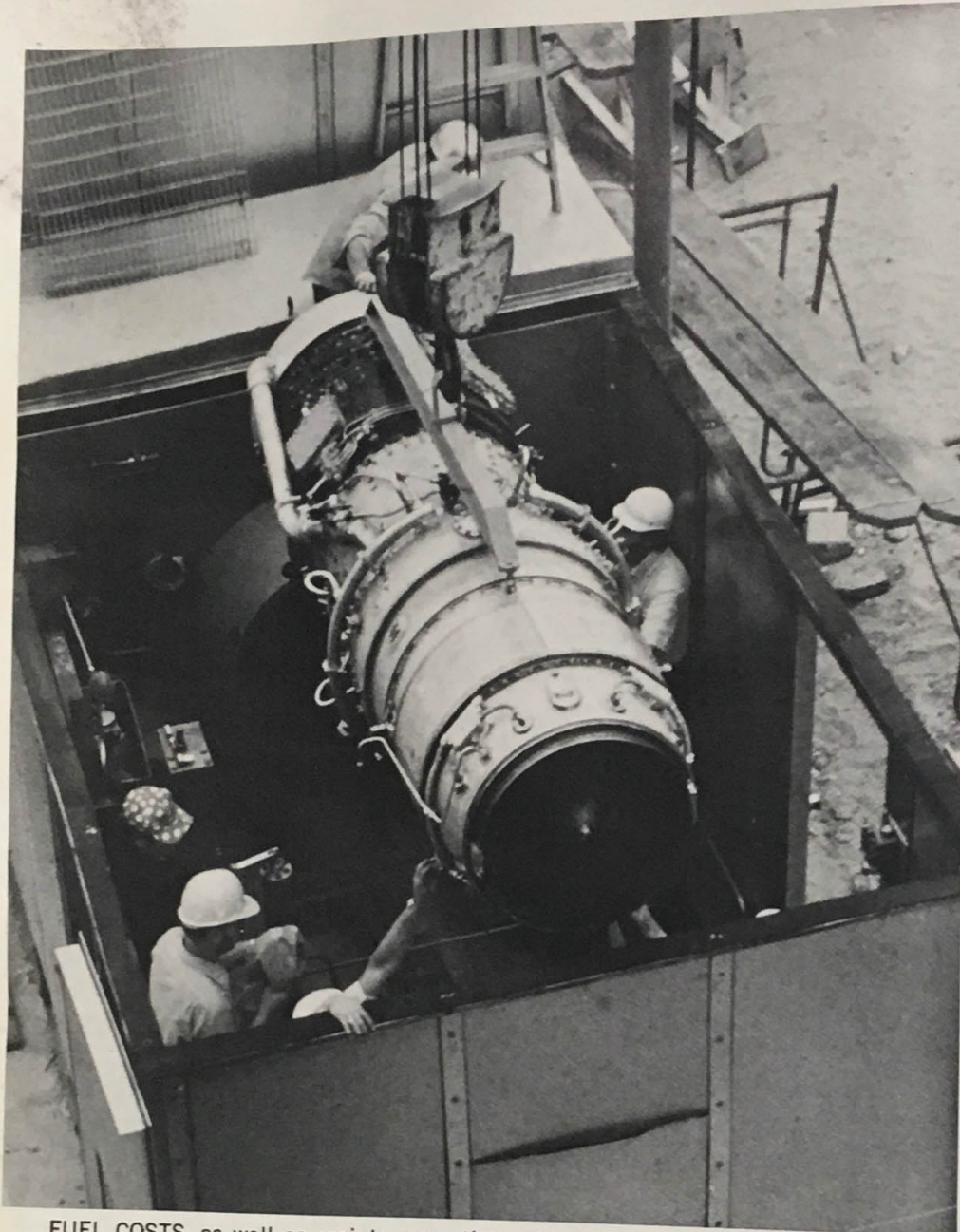
Although other industrial uses have been made of modified jet engines, the dual installation at the Products Company is the only known application of such engines for catalyst regeneration on the American continent.

Butadiene is produced by running butane feedstock through reactors in which hydrogen is removed from compounds by a chemical process. This separating process leaves an ashy carbon residue on the catalyst bed in the reactor.

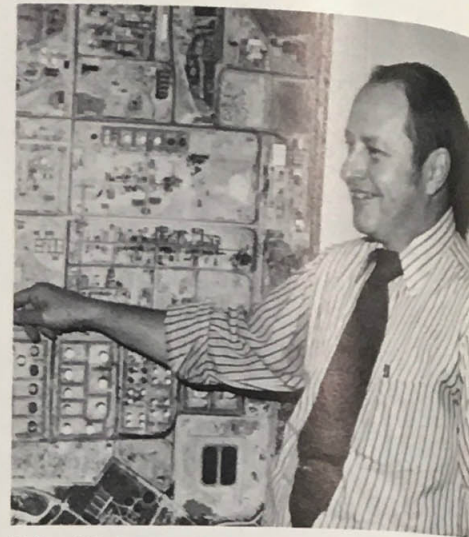
The oxygen-rich exhaust from the two 15,000-horsepower engines is extremely hot (approximately 1,000 degrees Fahrenheit). At 150 pounds per second air flow from each jet engine, the exhaust passes through the catalyst beds, burning off coke and carbon build-up. This action regenerates the catalyst in each reactor for the next load of feedstock.

"The original plant used the exhaust from industrial gas turbines, but due to maintenance problems and unreliability of the industrial units, we began looking into the possibility of using jet engines in butadiene production shortly after the plant was started up," explained Sam Gipson, project engineering manager. "At that time, engineering learned that several jet engines were available. We were considering modifying them for use as

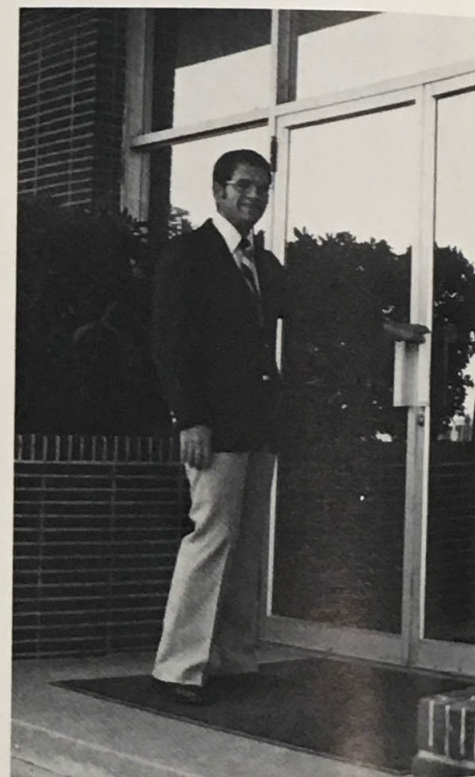
SWITCH to jet engines to regenerate catalyst used in the process to produce butadiene (used in the manufacture of rubber tires) has reduced approximate maintenance costs from \$200,000 to \$25,000 at the Butadiene Plant.



FUEL COSTS, as well as maintenance time, have been reduced significantly.

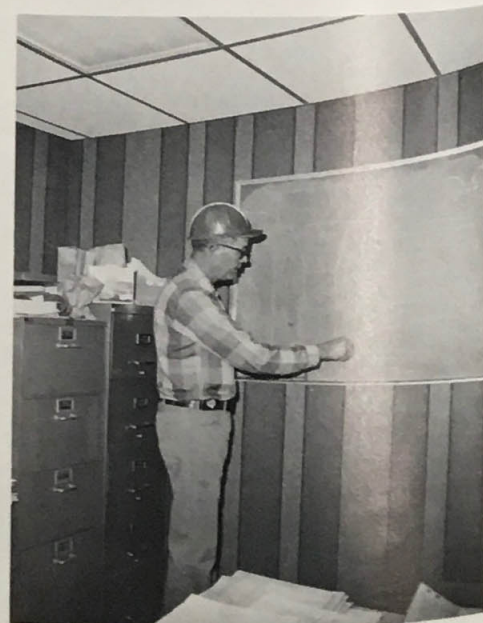
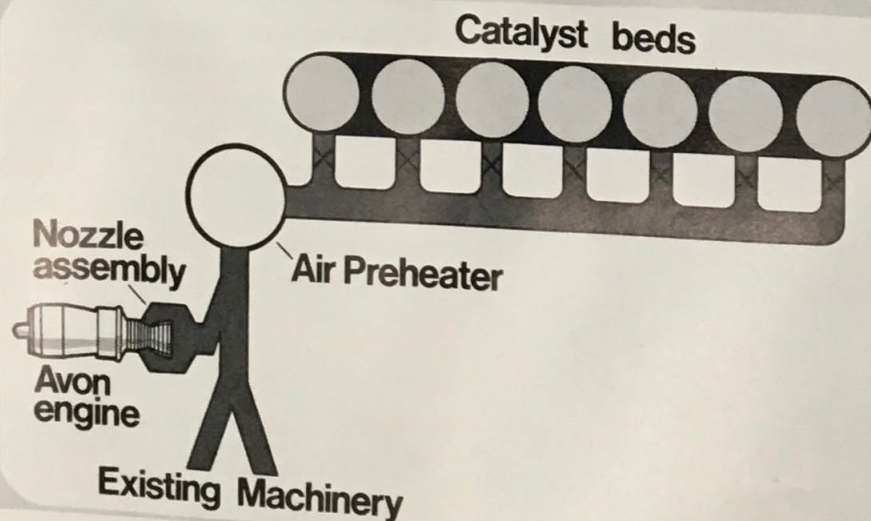


John Weir, engineering specialists manager



Sam Gipson, project engineering manager

Butadiene-regeneration installation



Bill Wright, construction superintendent

spare engines during the time the gas turbines were down for maintenance.

"There were several drawbacks to the project at that time," added John Weir, engineering specialists manager. "Confining the high temperature, high velocity exhaust in pipes was just one of the problems. In normal use, jet exhaust is vented into the atmosphere, providing enormous thrust that propels the plane.

"Exhausting a hot stream of air with such high velocity into a closed chamber presents special problems," he said. "Anything we welded inside the pipeline to control the flow of exhaust could possibly be vibrated loose and sheared off and carried along. Any bend in the piping created unwanted turbulence, and the stainless steel pipe had to be reinforced and bolted securely to anchors to prevent movement.

"In 1972, we were faced with a decision," Gipson said. "Within a year the gas turbines we were using would each have accumulated more than 100,000 hours of running time and would have to be replaced.

"We consulted several companies regarding the possibility of modifying a jet aircraft engine for our use. It was still considered unfeasible. Overcoming the pulsating back pressure in the reactors was still the major obstacle."

Then, during a discussion with a representative from Scotland, Gipson suggested that perhaps a 'critical flow' nozzle could be used effectively to control the back pressure. At first, the idea was dismissed.

A month later, however, Scottish engineers called with good news. They had designed a 'convergent/divergent' nozzle (see diagram) utilizing a shock wave set up by passing the sound barrier with the exhaust air flow. This shock wave barrier would effectively allow the jet to operate at a constant pressure while discharging into the varying back pressure of the reactors.

Bill Wright, construction superintendent, said "Preplanning included building a housing with a trolley rail to facilitate handling the engine. The 48-inch stainless steel pipe which would channel the exhaust to the reactors couldn't be prefabricated; it

had to be cut and fitted on the spot."

John Lafrentz, butadiene plant manager, said, "There are several major advantages in using jet engines. There's less downtime for repairs, less maintenance is required, and we get much better regeneration efficiency. That is, the jets take in much more air for the same amount of fuel burned."

Based on the successful application of the first jet engine, a second one was installed in November 1975. The two engines are the main source of regeneration air for the plant, and one of the original industrial gas turbines is kept for possible use on a stand-by basis only.

"In the course of developing the modifications necessary for using jet engines in the butadiene plant, we talked with many companies during the late 60's and early 70's" explained Jim Arnold, general engineering and construction manager. "Interest in developing the capabilities of the engine was high, but at that time no one had accomplished this unique type of conversion. There was nowhere we could go to find out whether or not it would actually work.

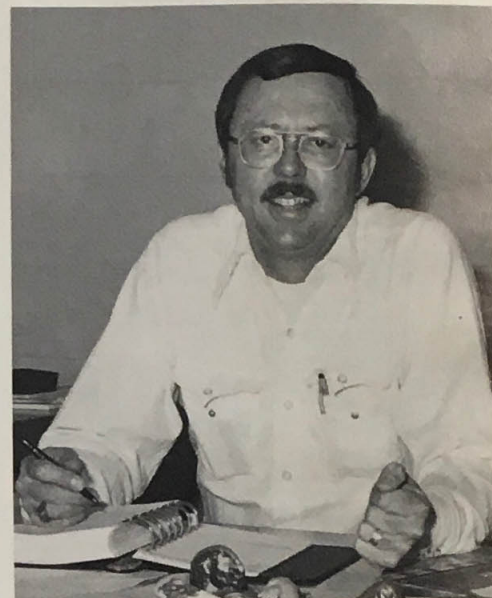
"In fact, one jet engine manufacturer told us they would not even supply us with a proposed design, because the application could possibly cause problems in their jets.

"But our engineering department had worked on and studied the problems. In spite of the negative feeling from many people, we were convinced it could be made to work and result in tremendous savings for us.

"Of course, there were risks involved, too, but we presented the idea, along with our recommendations, to our management group.

"They told us, 'All right, we like what you're saying. If you believe in your engineering analysis, we're willing to back you.'

"Since we installed the first engine in 1973, we've cut regeneration air compressor maintenance costs by more than two-thirds. These engines need to be serviced only once every two years, and we've effectively lowered our fuel consumption costs due to the greater efficiency of the jet engines.



John Lafrentz, butadiene plant manager



Jim Arnold, general engineering and construction manager

"As successful as this application of aircraft engines to chemical production has been," Arnold said, "to my knowledge, it is still the only installation in the U.S. Our management paid the engineering department a real compliment when they supported this project, accepting the risks that were involved. We're as proud of that as we are of the success of our engines."§



Six Afloat & Three to Go

THE *El Paso Cove Point*, sixth ship in El Paso's new fleet of nine liquefied natural gas carriers and the third such El Paso ship to be launched in the United States, slid gracefully into the Mississippi River during launching ceremonies late in 1976 at Avondale Shipyards in New Orleans, Louisiana.

Mrs. Agnes Clarke, wife of Bernard J. Clarke, chairman of Columbia Gas System, Inc., christened the vessel. Brightly colored balloons, streaming confetti and a thunderous blast from a Revolutionary War cannon heralded the christening. Tug boats moored the *Cove Point* several hundred yards downstream next to her sister ship, the *El Paso Savannah*, for final outfitting. At least one and a half years of additional work will be required before the ships enter service.

Like her eight sister ships, this 125,000 cubic meter ship will transport LNG from Algeria to the United States east coast. This ship carries the name *Cove Point* in recognition of the fact that about two-thirds of the gas will be delivered at Cove Point, Maryland, for sale to subsidiaries of Columbia Gas and Consolidated Natural Gas Company.

Principal speaker at the launching was Howard Boyd, chairman of the El Paso Company.

"There are other features besides the great engineering feat that justify being mentioned at this time," Boyd said. "Obviously, a great vessel costing in excess of \$100 million — and there are two others being built in this same yard — provides employment to thousands of people in this shipyard.

"Aside from that, this construction provides employment in other areas of the country where various component parts are manufactured and shipped here for assembly. These ships, and the project they represent, also serve the economy of Algeria, which has a surplus of natural gas so badly needed in our country. In addition, it provides a healthy domestic maritime industry essential to our national security.

"So often we read in the newspapers about the energy crisis, and I suspect that many in this audience do as I often do, and equate that in terms of oil. Today we hear that approximately 50 percent of this country's oil needs are now being imported. It is a surprise to many people to learn that natural gas from domestic production satisfies much more of our nation's energy needs than does domestically produced oil.

"Until there was a deterioration in our gas supply, natural gas supplied over one-third of this country's total energy requirements, and it supplied over one-half of the energy required outside of the known transportation demands. And yet, in the last five years, we have consumed natural gas supplies at twice the rate at which they have been replenished by discovery. There will be an inestimable catastrophe if steps are not taken to replenish that which we are consuming at such a fast rate.

"Unfortunately, there is of necessity an inherent time lag upwards of five years in supplementing the supplies of gas being exhausted in this country. The ship that you see here is part of a project that will become operational during the fourth quarter of 1977. It will take a period of about nine years from the time the contracts were executed to fully develop this source of supplementary supplies.

"You are witness to an important event in history because this project will be the first to bring such huge quantities of liquefied natural gas from such distant places as North Africa.

"Aside from supplementing our energy supply, the project will promote commercial intercourse between this nation and one of a differing political philosophy. Historically speaking, such intercourse can well serve the interest of peace.

"With that comment I would like to close, invoking God's blessing on this ship and the crews that will sail her, bringing essential energy to the United States over the next 25 years."§

THE FAMILY TREE

Growing Your Own

DAN BRENNAN is a gardener of sorts. For the past 30 years or more, he has been digging around the roots and shaking the branches of his family tree.

His genealogical cultivation has managed to produce documented evidence of numerous lines of Scotch, Irish and English ancestors, some as far back as 300 A.D. That's on his mother's side of the family. His father's ancestors are a little more difficult to track down — partly due to the fact that the Brennan branch is so fruitful, and also because every generation of Brennans used almost identical given names.

"In the national telephone directory in Ireland, there is a full page and a half of just Thomas Brennans," Dan explained. "Every time I think I'm coming close I discover that it's the wrong Thomas, and my grandfather has gone underground again."

What is it that causes a person to spend time and effort — and money — tracing his ancestors? Isn't what's here and now the important thing?

"Well, it just seems to be an inborn desire to want to know something about your parents," Dan responded. "Maybe it's because as children, we hear comments like, 'You're just like your grandfather,' or 'You take after your aunt or uncle.' It seems to me to be only normal curiosity to discover



THE MacNAB, by Raeburn, portrays Francis MacNab, who became the 12th Laird of MacNab in 1778. He is in the uniform of a Lt. Col. of the Breadalband Fencibles. Dan Brennan, now retired from the Company, is the archivist for the McNabb Clan.

in what ways we relate to our families.

"As you get involved with your family tree, you begin to realize that you're a minute part of hundreds and hundreds of people, and that certain traits that you have, have come down to you through centuries."

Dan had an opportunity to observe the truth of his statement when he attended a "gathering of the McNabb clan in America" which was held in July 1976 at Grandfather Mountain, North Carolina.



A stunning 63,000 persons including Clan McNabb, Clan McCubbin and Clan McKenny — related to

him on his mother's side — assembled for the gathering.

"The purpose," Dan ex-

plained, "was basically the same as it was for medieval clan meetings. They all came to conduct business, to socialize, compete in ancient Scottish games, and compare their latest genealogical research. There were 30 or 40 clans represented (a clan may represent an individual branch of the family or a member of a federation of clans). It was an exciting and moving experience to see all those strangers and realize that in some way they were distant relatives." (Continued)

"Somehow, history becomes more meaningful..."

Dan Brennan retired from El Paso Natural Gas Company in 1967. At retirement, he was Office Supervisor in Reservoir Engineering.

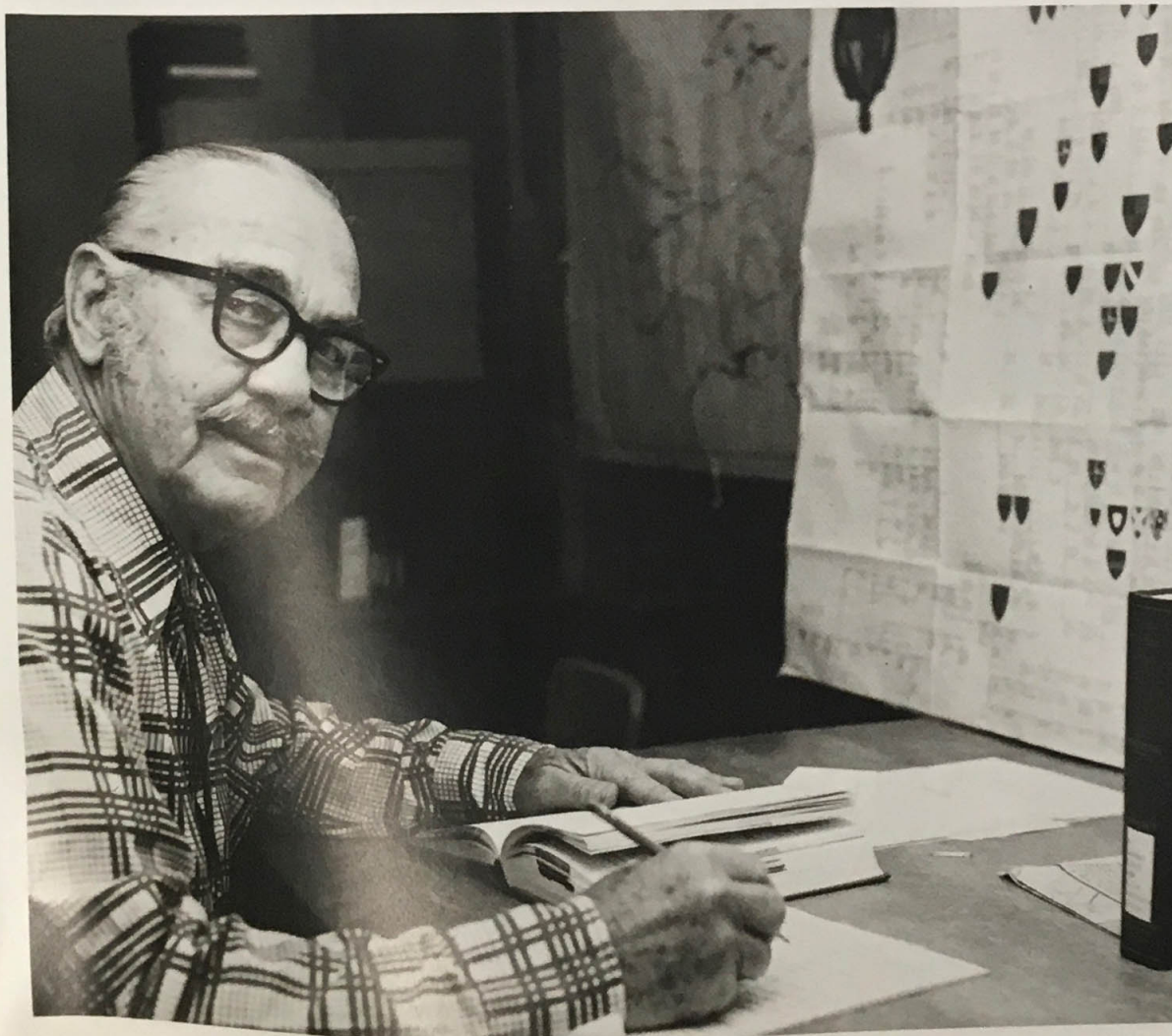
After his retirement, Dan

worked on the Apollo Project at White Sands for two years, and has subsequently worked as a consultant engineer for various projects.

His interest in genealogy was whetted when he found his great-grandfather's Bible which contained lists of relatives he had never heard of. That was in the year 1945. Since that time, but especially since his retirement, Dan has spent considerable time chasing down relatives via old records.

In the course of his search, which revolves around Maryland, Virginia, Kentucky and Tennessee, he has become quite an authoritative historian regarding the settling of America, and the westward expansion of the country.

"Somehow, history becomes more meaningful when a personal relationship with the events of the past has been established," Dan commented. "It's a real thrill to discover that one of your forebears had an active part in creating this great nation." §



The McNabb Clan Association of America was officially recognized in 1975 as connected to the original clan society in Edinburgh, Scotland. Dan serves as the archivist for the McNabb clan in America.

"There's another interesting facet to studying your genealogy," Dan said. "As your family tree begins to take shape, you find that your ancestors took root at

all levels of society. And very often, their children climbed up and down the 'social ladder' with great regularity.

"So, while some people investigate their genealogy looking strictly for the prestigious branches, they had better be prepared to find at least a few stubs growing further down on the trunk."

Dan related that his great-grandfather McNabb was a farmer. That was his life's ambition and he never

desired to do anything else. His brother, however, was a doctor. The offspring of the two brothers generally followed in the footsteps of their fathers. The farming father produced farmer children, while the doctor's children generally chose a professional career.

Among the upper branches of his mother's family, Dan has documented evidence that he is related to 12 Magna Carta sureties, six Revolutionary

patriots and three Knights of the Crusades.

The Magna Carta was the great charter of English liberties granted by King John in 1215 under threat of civil war. Twenty-five barons were chosen to be guardians of the charter, or to ascertain that the king did abide by the articles of the charter. In effect, they provided security, or surety.

The trail of his ancestors has led Dan to search dusty basement storages in li-

POPULAR event at the gathering of the Clans, was the tossing of the Caber, a 20-foot, 120-pound telephone pole.



libraries, musty archives, old courthouse records, old Bibles and family records, and census records in the United States, England, Ireland and Scotland, in search of clues.

He has made three trips abroad, in 1968, 1970 and 1973. In Belfast on the last trip, Dan told of a harrowing incident that happened at the airport.

"We were all waiting for our flight — there was quite a group — and a patrol of

English soldiers came through the airport. I guess they patrol it pretty regularly. It was obvious they were ready for trouble, the last man in the patrol walked backwards to protect the group from attack from the rear.

"Anyway, just as they came by, someone kicked a sandfilled ashtray and it went clanging to the floor. It scared everybody and the patrol immediately levelled their guns. When they realized what had happened, it seemed like everyone in the airport started to laugh at the soldiers. It was an uproar. The soldiers were embarrassed, but they resumed

their patrol with a very stoic attitude. It seems as though the laughter went on for nearly 30 minutes.

"It was a very tense situation. The fighting had been going on for some time. I saw windows shot out, and many of the top floor windows in buildings were boarded up as they had already been shot at."

But most genealogical searches take place under much less exciting circumstances. It takes a great deal of patience, a mind for details, and persistence.

Just as today, our immediate ancestors managed to move from place to place with great frequency. It's a rare thing to find even two

or three generations of one family at one location.

Even as they looked for new horizons and greener pastures, however, they left records behind them. Births, deaths, marriages, property, and sometimes court case records are in existence. Those are the records that you must find to verify the facts regarding their lives.

The logical place to start your search is with your immediate relatives. If your grandparents are still alive, chances are excellent that they can give you information concerning their parents and grandparents, as well as approximate times and places they lived. Family Bibles are quite often a storehouse of information. Wills are another source on which to build your family tree.

There are county records, state records, church records, census records, libraries with genealogical sections and federal archives to be searched. If your interest in history was less than enthusiastic, you may find that attitude changing as you follow your family back further in time.

Genealogy no longer concerns itself with the exclusive lineages of nobility, but has an equal fascination for all sorts and conditions of men, as family traits, characteristics and abilities tend to repeat themselves in successive generations.

What's in a name? According to Shakespeare's lovelorn Romeo, "That which we call a rose by any other name would smell as sweet." To Dan Brennan, and his fellow genealogists, a name is everything — it's a key to discovering who you are. §

A BONNY LASS identifies herself as a clan member by her colorful skirt, hat and purse.



A chip off the old rock

Turns Sandstone To Sculpture

JOHNNY VIGIL's tanned, weathered face and work-toughened hands exhibit little outward evidence of the accomplished artistry of this modest man. Neither, in fact, does his daily work, which is being a member of a pipeline survey crew in the San Juan Basin.

In spare hours, Johnny carves chunks of sandstone, collected from surrounding areas of the San Juan Valley, into animals and people — or whatever happens to strike his fancy.

"I used to whittle a lot when I was a kid," Johnny explained, "and this is just whittling on a bigger — and different — scale."

If it weren't for the enthusiastic backing of his fellow workers in the San Juan Division office in Farmington, Johnny would probably still be giving away all his sandstone sculptures to anyone who evinced an interest in them.

H. L. "Doc" Hadlock, San Juan plant facilities inspector, is one of his biggest boosters. And he's the proud possessor of Johnny's first sculpture — a lizard poised on a rock, seemingly ready to skitter away at the first hint of danger. This lifelike reptile occupies a prominent place on Doc's desk, along with some later carvings which include a coiled rattlesnake. Few people seem to care to touch the snake.

In the two years since he began sandstone carving, countless inert blocks of soft stone have metamorphosed into fledgling eagles struggling with their first flight, or shambling bears, shaggy, hump-shouldered buffalo, powerful mountain sheep with

great curving horns, as well as fish, lizards, snakes and birds. All his carvings have such appeal that all he has to do is show them and they're sold.

"Hey, Johnny, how much for this one?"

Johnny shrugs uncertainly and glances at Doc.

"C'mon, Doc, John's too modest. You set the price. How much?"

Doc grins a little, savoring the moment. He tugs at his elegantly waxed and curled mustache, then names an outrageous price.

Amid the whoops and whistles, someone shouts, "Does that include your 15 percent, Doc?"

"Be serious, now, Doc. I've got to have that bear... just look at the expression on its face."

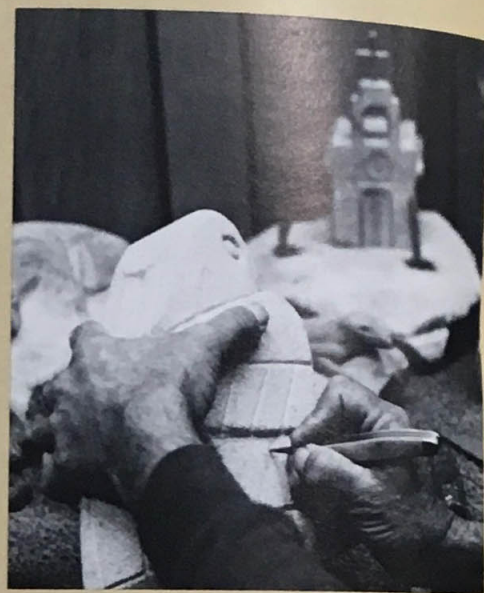
After more good-natured joshing the price is settled and another of Johnny's engaging sculptures has found a good home.

Johnny carves in two distinct styles, perhaps reflecting both the Indian and Anglo heritages in his family. One large eagle is very square and stylized, much like the carvings on ancient temples in Inca/Aztec/Mayan cultures.

Some of his sculptures could easily be mistaken for artifacts from an archaeological dig. Others — such as his bear and crow — are very realistic, very contemporary.

Ideas for stone carvings come from many places, Johnny explains. Sometimes the shape of the stone determines what it will finally be.

"Lots of times I'll start carving with something specific in mind," he said,



SKILLED HANDS of sculptor Johnny Vigil place finishing touches on a glowering eagle. Once the basic shape is carved, Johnny utilizes just a few lines and circles to give character. Doc Hadlock admires Johnny's work, shown in samples below.

"and as I work the stone, it just changes. It's almost like the stone does the deciding. I guess that's why no two carvings are ever just alike, even if they're of the same thing."

Several exhibits of Johnny's sculptures have been arranged by his co-workers.

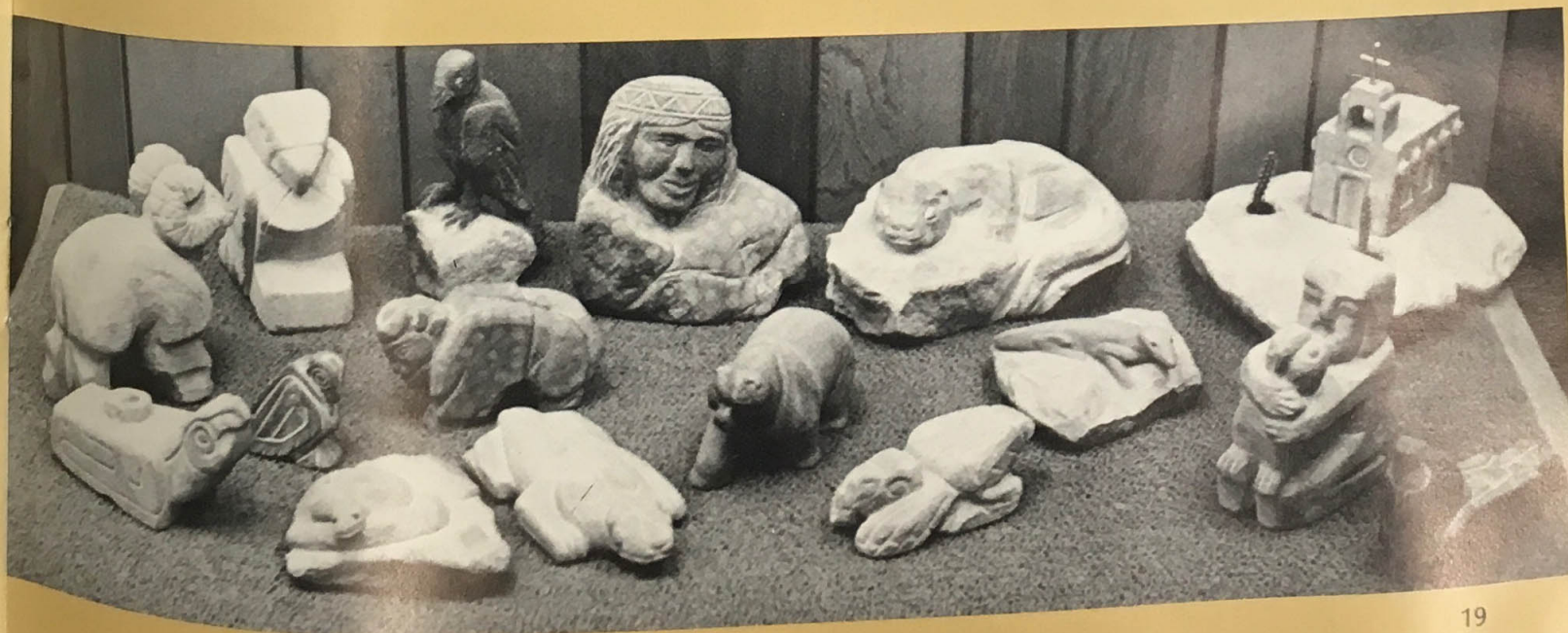
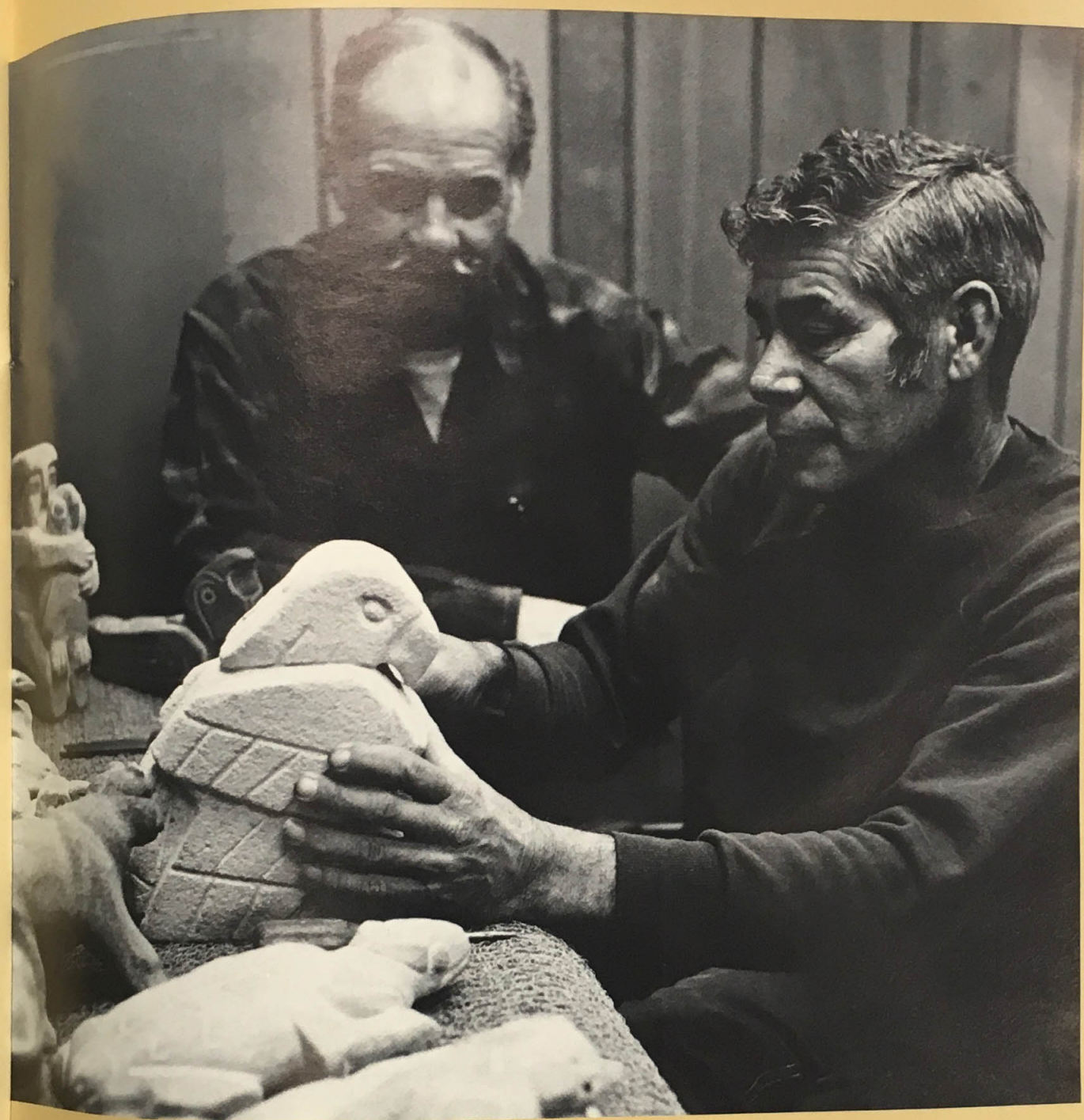
"The problem is," he said, "that I have a hard time keeping enough pieces on hand to put on a show."

But his grin makes it evident that he takes as much pleasure in others' enjoyment of his handiwork as he received out of creating the carvings.

Johnny's sculpting tools are a chisel, chipping hammer, and a tungsten steel carbide file. Oh yes. And a pocketknife. With a very worn blade.

With these few simple tools and a chunk of rock, he creates wildlife that he often sees in his surveying work, or in his travels throughout the San Juan River Valley. They are creatures that live quietly — and for the most part, unseen — in the arid Southwest.

Johnny understands and cares about his quiet world, and this concern is evident in his sandstone desert denizens. They are indefinably and indelibly imprinted with the feelings and personality of Johnny Vigil, whittler in stone. §



(And nickels, dimes, quarters and halves)

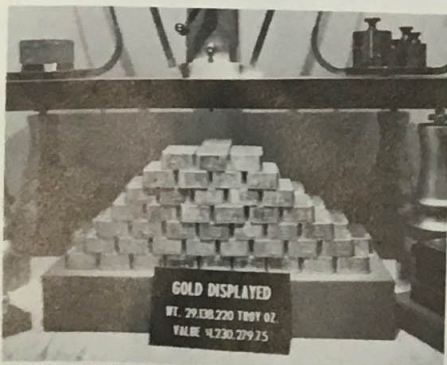
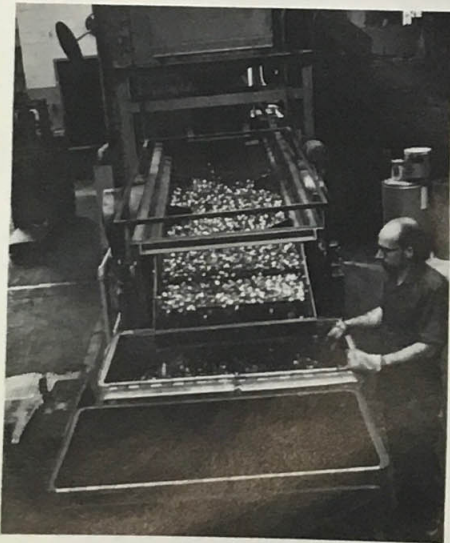
PENNIES FROM DENVER

MAKING PENNIES is not penny ante business. The United States Mint at Denver, Colorado, makes an average of 28 million coins per day and 75 percent of them are pennies. That's 21 million new pennies every day. Purses and pockets must bulge with all those jingling copper coins.

"Not so," laughs Mrs. Betty Higby, superintendent of the Mint. "It's a real mystery to us just where all those pennies go."

"We surmise that between collectors who stash

IN ADDITION to making coins for Americans, recently the Denver Mint has been producing coins for many foreign countries.



THE GOLD displayed is valued at \$1.23 million based on the government price of \$42.222 per ounce. Market value? More than \$3 million at prices in mid-January.



them away, and people who come home at night and empty their pockets into a change jar, and those who consider pennies so worthless they won't even stoop to pick one up from the sidewalk, pennies are just not being kept in circulation. But we honestly don't know just what does happen to those millions and millions of coppers that we mint every day."

Pennies, made from a copper and zinc alloy, contain 95 percent copper and 5 percent zinc. It costs .7¢

(seven tenths of a cent) to make a penny. It costs the same amount to mint a dime. A nickel costs 1.5¢; a quarter is about the same — 1.6¢. A half dollar costs 3¢ and the one dollar piece, when it is in production, costs 6.5¢ per coin. As costs of basic metals and manufacturing costs change, the cost per coin fluctuates.

Mrs. Higby said, "A daily statement is prepared by our accounting office that I must sign, which is sent to the U.S. Treasurer's office. Among the items listed

is the amount of seigniorage on each day's production of coins.

"As you may know, seigniorage is the difference between the face value of the coin and the cost of the metal it is minted from. That figure varies, of course, but very rarely does it drop below a million dollars a day. So the Mint pays its way and makes a profit for the government, too."

Nickels contain a combination of 75 percent copper and 25 percent nickel. This combination or alloy, called

"cupro-nickel," is a standard alloy for coins the world over.

With the exception of pennies and nickels, all other coins are made in three layers — like a sandwich — and called "composite coins."

Visitors to the Mint watch with fascination from a glassed-in balcony as coins cascade from machines in various stages of production. Children delight to see workmen wheel in large rolls of copper and cupro-nickel weighing from four



MRS. BETTY HIGBY is superintendent of the Denver Mint.



to six thousand pounds. Overhead pulleys slowly lift the rolls, mounting them on spindles attached to stamping presses.

From the spindles, the sheets of metal feed into blanking presses which punch out round pieces of metal of the proper sizes, called "blanks." At this point, as they tumble into large baskets, they look more like play money than real coins. Leftover metal from the stamping, or blanking, operation is recycled.

Hildreth Frost, Mint assayer, explained that his department assays samples from every strip that comes into the Mint.

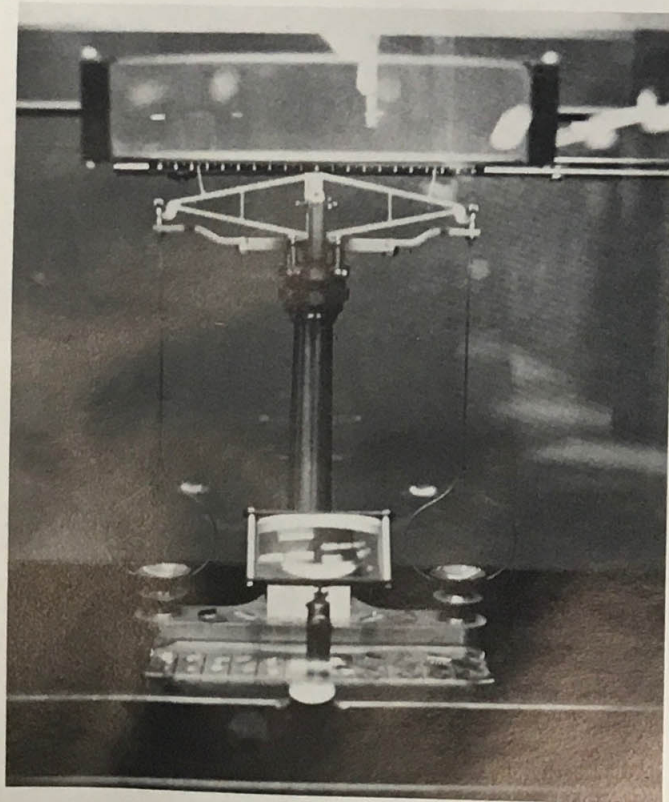
"General specifications state that samples may vary up to 10 percent," he said, "but we actually hold it to within 0.25 percent (twenty-five hundredths of one percent).

"In addition to assaying the purity of the rolls of metal, we have three inspectors who watch the quality of the physical condition of the rolls. They check to be sure they're clean and have been rolled properly. They're concerned with whether or not the rolls are of consistent thickness and they test the hardness of the metal."

After punching, the blanks enter a gas furnace to be softened for stamping, in a process called "annealing." Temperatures in the annealing furnaces reach 1400 degrees Fahrenheit, causing the blanks to become red hot.

After cooling, the blanks are washed and dried. Then a machine called an "up-setter" rims the edges. The blanks have now been prepared to receive the impression which makes them valuable as units of monetary exchange.

The stamping machine



FINELY-BALANCED scales are used to weigh small amounts of metals or chemicals. At right are newly minted pennies.



processes both sides of four coins at a time, operating at a rate of 135 times a minute. One machine produces 540 stamped coins every minute of the work-day.

Individual coins receive their impressions from steel die stamps made in Philadelphia, and are shipped under very tight security to the Mint at Denver. Once they begin to show wear, the dies are destroyed. In meantime, they are kept under guard in a vault to which very few persons have access.

Occasionally, a coin enters the stamping machine a little off-center, resulting in an imperfection.

"Although we screen every coin to be certain each one is perfect," the guide explained, "every once in a while, to the special delight of collectors, an imperfect one gets into circulation. But our inspectors manage to keep bad coins to a minimum."

After this final inspection, automatic machines tabulate individual denominations, bag them in specified amounts and sew the bags shut. This shiny new money does not immediately go into circulation, however, but is shipped to Federal Reserve Banks from where disbursement to member banks actually starts in on its journey into the economy.

Congress established the Denver Mint in April 1862. At that time, a company called Clark, Gruber & Co. purchased gold from miners and manufactured five and ten dollar gold coins for circulation.

In September 1863, the government acquired the facilities of Clark, Gruber &

Co., and the Mint began business with melting, refining, assaying and stamping cast gold bars.

The Mint operated essentially as an assay office until 1906, when it added coinage to its operations.

In the first year of coin-making, 167,371,000 coins were produced. Today, annual production totals 6 billion coins, and full-scale assaying is no longer done.

The Mint is housed in a five-story, block-square granite and marble building facing East Colfax Street between Delaware and Cherokee Streets. This imposing granite building of high interior ceilings and creamy marble arches and pillars is a monument to the builders of the 1900's. Impressive wall and ceiling murals painted in muted

colors, as well as marble sculptures on walls and cornices make viewing the building as interesting as watching the production of coins.

Armed guards, stationed at all entrances, are also very much in evidence throughout the building. They maintain a thoroughly professional, business-like attitude, yet at the same time manage to be friendly and helpful. All visitors undergo a routine check when they enter and leave the Mint, much as they do at airports.

Outside the building, a spiked black wrought iron fence completely surrounds the Mint, intensifying the feeling of tight security. It seems to warn passers-by that something special is housed within.

"Although the Mint has been designated as a historical landmark and will therefore not be razed, we may not be located in this lovely building much longer," Mrs. Higby said thoughtfully. "We outgrew our manufacturing space several years ago and we've been having to put up with quite a few inconveniences in the production of coins as a result."

"Recently a tract of land was purchased for the building of a new Mint. However, a bill to construct a new facility was introduced in the 94th Congress, but did not get out of the Banking, Housing and Urban Affairs committee before Congress adjourned. Hopefully, the bill will be re-introduced, and we'll have a new Mint building soon."

"While this building is a lovely monument," she smiled, "and possesses great charm, it leaves a great deal to be desired as a production plant."

Philadelphia has the only other coin production facilities in the United States, although proof coins are now manufactured by the United States Assay Office. They bear the letter "S". The West Point Depository presently coins pennies because of the current shortage.

A tour of the United States Mint at Denver is both impressive and educational. And who knows? Perhaps the coins being made on the day of your visit will contain metals mined from Arizona's Lake-shore Mines, a joint venture of The El Paso Company and Hecla Mining Company. §



ROLLED SHEETS of copper and cupro-nickel are placed on spindles and automatically fed to "blanking" presses for sizing.

EXCEPT during working hours, when they are required by Sonatrach to wear European-style clothing, the rural Algerian women still wear their traditional attire. Ken Corder poses here with one of the domestics at the compound.

algerian adventure

El Paso's Engineer/Professors Look, Learn, Remember, Report

WHILE ON AN OVERSEAS assignment, El Paso Natural's two engineers-turned "college professors" — Ken Corder and Charles Dellert — conducted classes in compressor station operations, station management and trouble shooting for 37 employees of Sonatrach, the national Algerian oil and gas company.

When not in the classroom, El Paso's two engineers took advantage of their unusual opportunity to explore Algeria.

During their travels, Corder and Dellert observed firsthand a portion of the globe most of us only read about or glimpse on TV. They found Algeria a vast and varied land, its people eager to learn.

"We left America on a Saturday morning and arrived in Algiers 22 hours and six time zones later," recalled Corder. "Even a stopover in London didn't relieve the 'jet lag' we experienced.

"From the air, Algiers appears a beautiful patchwork of modern glass buildings interspersed with ancient white-topped Arab sections," noted Dellert. "The city surrounds an impressive crescent-shaped natural har-



bor and serves as the commercial hub for the entire country."

Upon landing in Algiers, airport security guards escorted the El Paso employees to immigration and customs where government officials asked them the usual questions. Only this time the questions were posed in French. When they didn't understand a single word, they immediately realized that the \$18 French record lessons and their pocket dictionaries were inadequate.

Dellert said that traffic congestion in Algiers compares with any large American city, the only difference being the size of the cars and trucks. Algerians, he noted, drive more aggressively.

Dellert and Corder found the Algerians cooperative, eager to learn. Sonatrach's students included station chiefs, shift supervisors and pipeline and compressor station maintenance foremen.

"While in the city, we stayed at the Hotel Aurassi," Corder commented. "The Aurassi was the most impressive

and modern facility we saw during our assignment. Rooms were spacious, clean, well furnished and relatively expensive. A single room cost 250 dinars a night, about \$62.50 U.S. currency, and a drink in the hotel bar ran upwards of 10 dinars. Each dinar equals roughly 25 cents.

"We found several excellent restaurants in Algiers," he remarked, "but none with menus in English."

Lunch or dinner includes at least three courses and commonly lasts two hours or more. Soup or shrimp are served first, followed by fresh fish or an omelet. The main course includes meat or fish with fresh vegetables. Interestingly, Algerians, like the French, eat their salad after the main course. Dessert consists of fresh fruit or cheese and is served with cups of thick, black coffee. Beer or wine with the meal costs extra, and bottled drinking water must be ordered separately. A typical meal at one of Algiers' better restaurants costs anywhere from 60 to 85 dinars (\$15-\$22) per person plus tip and beverages."

From Algiers, Corder and Dellert traveled inland by private automobile to Laghouat, a Saharan oasis 400 kilometers (250 miles) south of the coast and one of Sonatrach's pipeline service facilities.

The Atlas Mountains separate the fertile coastal belt from the arid Sahara.

"The day we crossed the Atlas, rain was falling in buckets. Cascading rainwater created spectacular waterfalls at every turn of the narrow highway.

"We also encountered wild monkeys which inhabit the rugged mountains and are protected by owners and customers of a private resort. They appear totally unafraid of humans and we observed several clowning for candy from tourists. The monkeys put on quite a show, much like the bears in Yellowstone."

On the southern or leeward side of the Atlas, the terrain gradually changes from mountains to hills as the narrow

highway snakes down toward the desert floor.

"The Sahara at this point is not completely barren, but to our surprise rather like El Paso or Jal with rocky hills and small patches of vegetation," Corder explained.

"Laghouat looks just like a scene out of *National Geographic* — adobe buildings, ancient mosques, men wearing traditional baggy pants and turbans, women covered except for one eye, donkeys pulling small carts or drawing water from wells, and nomadic Bedouins riding camels. The scene reminded me of a Hollywood movie set, complete with actors right out of central casting."

Dellert said Laghouat sports several small stores, most shopping takes place early in the morning in an open field near the edge of town. Nomads herd sheep, goats and other livestock to sell or trade, farmers cart fruit and produce, and local merchants set up tents literally bulging with assorted odds and ends for sale. The final result resembles a colorful flea market with

shoppers emphatically haggling over prices.

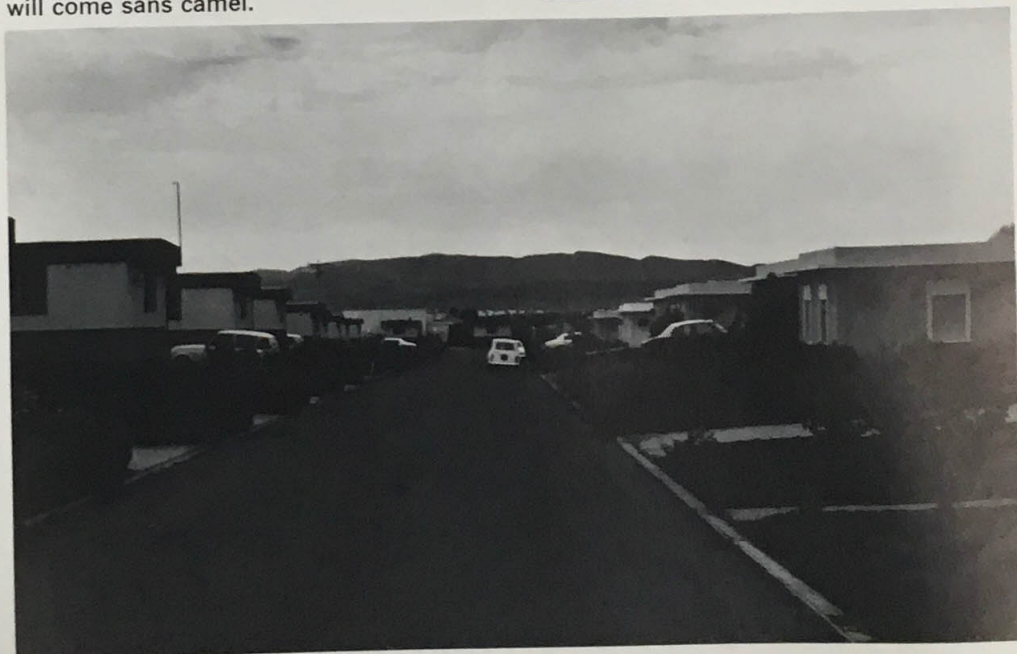
Before the two Americans arrived, the Algerian students had successfully completed seven months of training in algebra and higher math, chemistry, physics and engineering sciences.

"We inspected Sonatrach's new pipeline service complex," Corder said, "and visited with several supervisors. Many were young engineers who, like most Sonatrach employees we met, were friendly and were well qualified for their assignments."

After leaving Laghouat and visiting two compressor stations under construction further south, Corder and Dellert returned to the coast and established residence at Zemmouri El Bahri, a small fishing village east of Algiers.



EL PASO'S employee camp, still in the planning stage, will probably resemble this modern compound built to house an American construction force. The camp, however, will come sans camel.



Here, Sonatrach provided living quarters for foreign faculty members teaching at the National Petroleum Institute.

They lived in a small masonry villa on the beach in an unfenced compound originally built by Sonatrach for vacationing middle management employees.

"We encountered perfect weather during our three-week stay on the coast," Dellert said. Even though their villa wasn't air-conditioned, it was usually quite pleasant with cool sea breezes and temperatures ranging from 65 to 80 degrees.

"The surrounding countryside was primarily rural and agricultural," Corder said. "Villagers in Zemmouri El Bahri lead slower lives than do their counterparts in Algiers. They have time to stop and visit with each other, like small town Americans, and seem to depend more on each other than do city-dwelling Algerians.

Even aided by interpreters, language difference did cause minor problems. Some technical terminology seemed to defy interpretation.

Both Americans agreed that shopping in rural Algeria was an experience in itself, especially when you don't speak the language. "Take grocery shopping for example," Dellert said. "You can't just run down to the local supermarket like you do back home. Since no one store carries all the items you want, it is common practice to shop each day in several small stores. Sometimes you even have to travel to neighboring villages to find all that you need."

When you don't speak French or Arabic or Berber, you end up pointing and using crude sign language.

"Some items we Americans consider necessities are still considered luxuries in North Africa. Items such as T-bone steaks, aluminum foil, catsup, paper towels, frozen foods, bleach and modern kitchen utensils are not available in rural Algeria. Of course, bacon and other pork products are unavailable



THE COURSE taught by Corder and Dellert concluded the training program. Sonatrach and faculty officials pose following graduation. Dellert is second from right.

because of religious beliefs. We also found that stores did not carry any inventory except for what was on the shelves and did not reorder until completely exhausting supplies on hand. Therefore, some goods were available only on certain days of the week. Bottled drinking water, for instance, was usually available on Tuesday, Wednesday and Thursday at the small general store we frequented in Boumerdes."

Corder interjected, "The quality of some Algerian foods, particularly fish, bread, fruit and vegetables, was much better than back home. Algerian fruits and vegetables are vine-ripened and much more flavorful. Fish, of course, was fresh daily, although variety depended on the local catch. And their coffee was the best I ever tasted.

"Bread was also quite good and cost only about nine cents a loaf. But long lines at the bakeries did cause some inconvenience. One day the bakers stopped selling bread completely because the line was not orderly. We found meat prices comparatively high, about \$3.50 per pound. Butchers charge the same price for all meat cuts, from roast to hamburger."

Everywhere Corder and Dellert journeyed, they were extremely impressed

with the Algerian people. "I can't recall meeting a single unfriendly Algerian during our entire stay," thought Dellert. "Everyone we met, from Sonatrach management on down to the local man on the street, was exceptionally friendly and helpful."

Corder offered an example. "You walk into a crowded grocery store looking for a bottle of cooking oil. You don't know where to find it, or what to ask for, or even what size or shape bottle it comes in, or if it comes in a bottle at all. Yet, the busy merchant who can't speak English, patiently assists you in your search. You find out quickly what kind of people you're dealing with. That's what we enjoyed most about our assignment—the wonderful people. The Algerian people made our trip."

Dellert said, "All of our Algerian students worked hard and were well qualified, attentive and studious. They were friendly and very much interested in El Paso's experiences. I firmly believe that Sonatrach's training programs will produce some of the most knowledgeable personnel in the gas industry."

Contract Archeology



IN A CURIOUS WAY the nation's increasing hunger for oil and natural gas may result in a better understanding of prehistoric Indians in the American Southwest.

Nowhere in this region of abundant early Indian sites is this more evident than it is in El Paso Natural Gas Company's San Juan Division.

Laws protecting antiquities, combined with growing oil and gas well activity, have resulted in increased archeological study of ancient Indian sites that face possible disturbance.

Located in the Four Corners region of northwest New Mexico, the Company's San Juan Division operations extend from Durango, Colo., in the north to Cuba and Gallup, N.M., in the south. Bounded on the west by a portion of Arizona north to Aneth in the southeastern tip of Utah, the Division extends east to the Jicarilla District of the Carson National Forest in New Mexico.

It is an area rich in prehistoric Indian artifacts and remains the home of modern Indian tribes including the Navajo, Jicarilla Apache and Utes.

The area contains evidence of a nearly complete spectrum of prehistoric man in the American Southwest, dating from 10,000-year-old Folsom stone points to the Pueblo Refugee from 1680 to about 1730. Early Navajos are known to have migrated into the area from the Northwest as early as 1540. Most sites date from about A.D. 800 to 1300 and were occupied by the Anasazi People who are believed to have been ancestors of modern Pueblo Indians.

Within the San Juan Division are the major and well-protected Anasazi

FLAG marks a proposed well site on Wild Horse Mesa 100 miles southeast of Farmington. Harland Gould and Charles Werner, Company employees, watch as John Keller prepares notes on environmental impact.

sites at Mesa Verde, Aztec and Chaco Canyon, as well as Salmon Ruin which is currently under excavation.

Today's increasing demand on the region's oil and natural gas reserves, however, exposes hundreds of the smaller, less known of these sites to potential disturbance.

A federal law passed in 1974 requires an archeological survey in advance of such activities before use permits are issued on federal and Indian lands. A similar procedure is required on state lands. The smallest percentage of land ownership in the Company's San Juan Division is private land upon which archeological surveys are not required by law.

Longtime Division employees recall that even before archeological surveys were required by law the Company made an effort to protect prehistoric sites encountered during well drilling and related activities.

Earl Mealer, project engineer in the Division, said museum archeologists from Santa Fe were called in by the Company as early as 1972. One of Mealer's responsibilities is to insure that the Company meets archeological clearance requirements.

Harland Gould, drilling field supervisor with more than 20 years of Company experience in the Division, recalled that when significant archeological evidence was encountered during Company operations, professional archeological assistance was sought long before it was required by law.

Both Company personnel and archeologists agree that the law has brought about more archeological field surveys within the Division.

"It's a great service to archeology," said San Juan County Museum Association Archeologist Nancy Hewett of Farmington. "It may be a big pain to a lot of people but it does have its benefits," she said.

The Company presently contracts with both the museum, located at the Salmon site just west of Bloomfield, and New Mexico State University through its San Juan Branch College in Farmington for all archeological surveys in the San Juan Division.

The museum's contract archeology

program has operated since September, 1974, under Department of Interior permits issued to Eastern New Mexico University at Portales. Contract work for El Paso and other companies in the region is also an important source of museum income. "It keeps the doors open," Mrs. Hewett said. "El Paso is contributing to the community in a very real way."

For the period since the museum's program began through October, 1976, museum records show inspection surveys were completed for 336 Company field localities in the San Juan Division. Museum survey work cost the Company \$5,880 for the period from September, 1975, through early November, 1976.

Conducting surveys for the museum, in addition to Mrs. Hewett, is museum archeologist Pat Zarnowski.

New Mexico State University archeologist Billy J. Naylor reports San Juan College completed 87 site surveys for the Company for the period

of January through November, 1976. The university's survey work in the Division also began in the Fall of 1974.

The history of federal laws intended to protect archeological sites dates back more than 70 years, beginning with the Antiquity Act of 1906 which established the basic principle of preserving the nation's historic and prehistoric resources.

A number of additional federal and state laws with similar intent were passed in succeeding years, but federal statutes often lacked effectiveness until 1974 when Congress amended the Reservoir Salvage Act of 1960 to require funding for protection of archeological resources endangered by programs authorized by any federal agency.

"Until then," Mrs. Hewett said, "there were just no teeth in the legislation."

Charles Werner, drilling technician in the San Juan Division, recalled that until about two years ago field operations required much less paperwork.



"It'd just be a matter of a phone call (to the U.S. Geological Survey office) and we'd go do it," he said. Once a road or well pad had been surveyed, road building and heavy equipment followed almost immediately.

Now, in addition to a stack of paperwork on each well, there is an average 30-day delay before final approval is granted from the various governmental agencies involved, Werner said. And new regulations could increase the de-

lay to as long as 90 days, he added. Delays are also caused when snow cover prevents an archeological survey.

But Werner does see value in the archeological surveys. The archeologist will "see something on the ground that we won't see because we're not archeologists," he said. Company crews and drilling contractors did not intentionally damage sites but it sometimes occurred, Werner said, because the men simply were not aware of the presence of subsurface ancient Indian dwellings.

Archeologists also admit they are sometimes made aware of sites by Company crews whose familiarity with land is the result of years of experience in the field.

Mrs. Hewett said her main concern is to preserve the site which, when discovered in New Mexico, is registered with the state's anthropology laboratory in Santa Fe for possible future excavation.

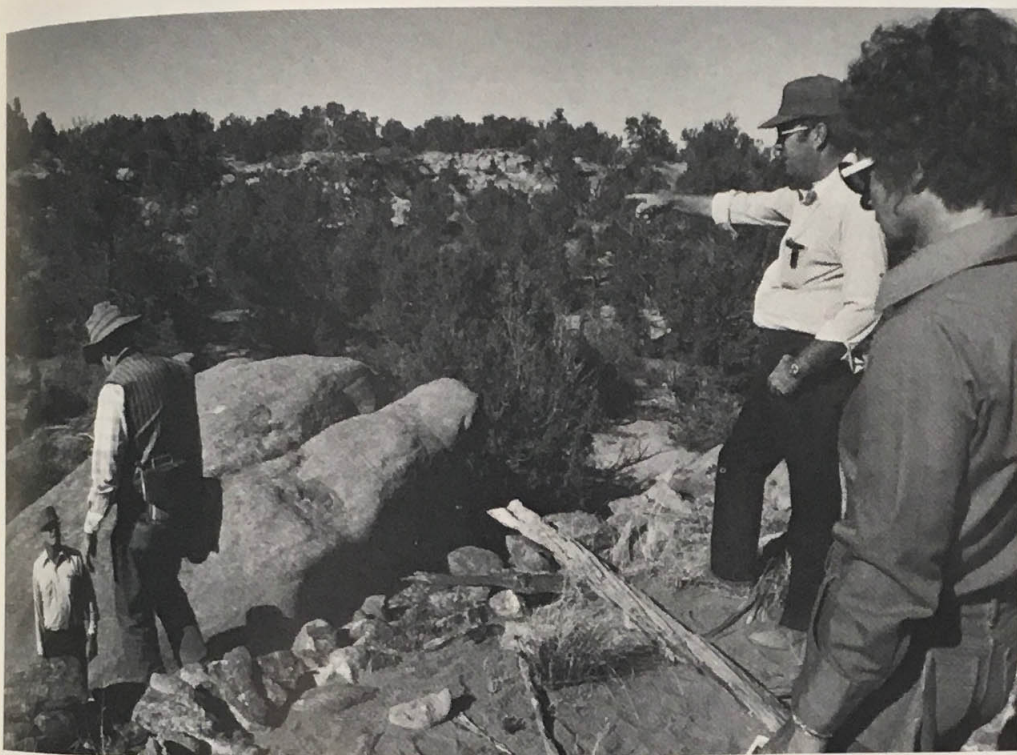
Salvage archeology is undertaken only when a site must be destroyed. "Salvage archeology usually has to be done in a hurry. And it's not done as well . . . when you have a bulldozer waiting in the wings, you just don't do as thorough a job," Mrs. Hewett said.

When salvage archeology is not undertaken the number of artifacts collected is limited and they are collected primarily for identification and preservation of whole artifacts, she explained. Such artifacts are stored at the museum and available for public inspection and site verification.

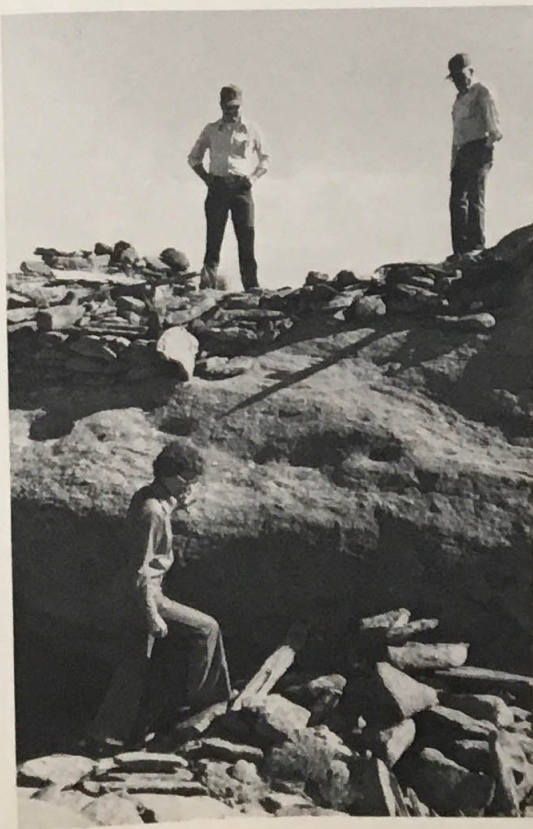
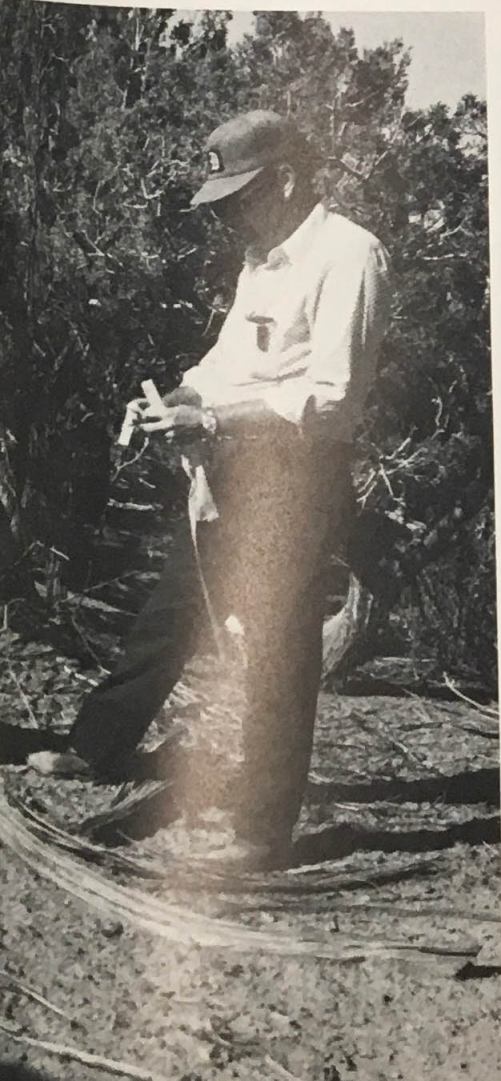
In many instances, a minor deviation in a road or well location is sufficient to protect any Indian sites located.

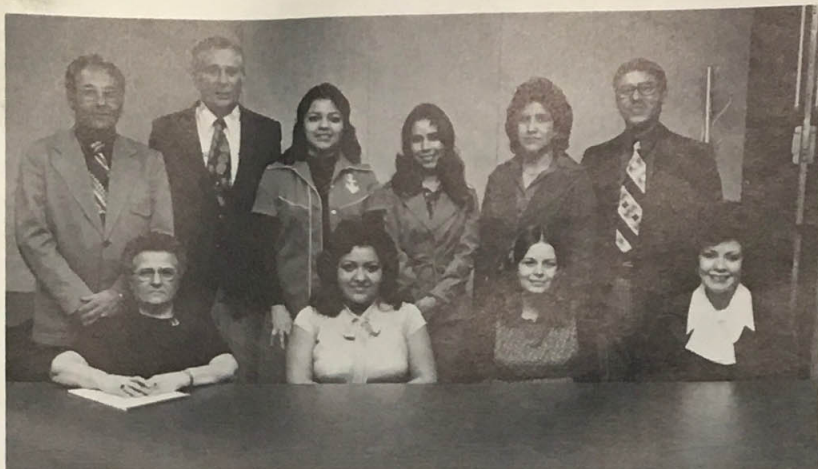
The archeologist does not have authority to halt Company projects, but his recommendations are given serious consideration by the government agency involved prior to granting the archeological clearance, Mrs. Hewett said.

Location of pottery sherds alone is not the objective of a field survey, Mrs. Hewett explained. "The museums are filled with pottery. The objective is to preserve the living sites. I wouldn't want them disturbed . . . I feel my job is to locate the living sites and to protect them."§



LEFT: Gould and Werner inspect a summer shelter site with Nancy Hewett, archeologist with the San Juan County Museum Association. The road to a proposed well site was realigned to avoid disturbance of the site. ABOVE and BELOW: The group examines rock outcrop.





GRADUATES and Personnel Administration employees are shown here after successful completion of a Company-sponsored Shorthand I course. Pictured are (seated, from left) Helene Morris, Sylvia Luna, Cathie Buffington and Rebecca Shep-

herd; (standing, from left) Johnny L. Hodges, J. M. Bonds, Maria Carbajal, Terry O. Jacques, Cecy Tercero and Larry Cano. Not shown were Josefina Vallejo, a student, and Mary Ann Ramos, instructor.

BRENDA MURRAY, daughter of Mr. and Mrs. Joe B. Murray of Jal, has been elected the 1977 president of Alpha Delta Pi Sorority at Texas Tech University. A junior majoring in advertising/mass communications, she maintains a 4.0 grade point average and has remained on the Dean's List each semester she has attended. Her father is a well test supervisor in the Production Department.



AIRMAN John W. Plant, son of Mr. and Mrs. Alfred M. Plant, has completed basic training and is now assigned to a telecommunications unit at Minot Air Force Base in North Dakota. John's father and mother live at Salt Flat, where Alfred works at Guadalupe Station.

RECENTLY RETIRED



JAMES D. ADEN; Permian Division; Engineering—Jal; August 1976/19 years.



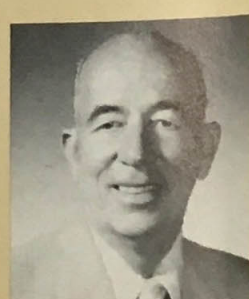
CHARLES H. FOUST; Southern Division; Tucson M/L District; December 1976/31 years.



BEVERLY A. GARDNER; Rate Department; Main Office; November 1976/8 years.



JOHN R. MCCALL; Permian Division; Pembroke Station; December 1976/30 years.



JOHN C. SPARLING; Permian Division; Warehouse—Jal; December 1976/37 years.

ple



THE GREEN GIRLS of Coya-nosa, daughters of Mr. and Mrs. Clifford Green, have received honors at Buena Vista school. Linda, (top left) a sophomore, was crowned Homecoming Queen during the football season and Melisa, an eighth-grader, was chosen Halloween Princess. Their father is a plant operator at Waha Plant.



EL PASO City Champs in minor league play (ages 8 to 10) ended this past season with a 20-4 record. Pictured in "Banner's Brigade" are (bottom row, from left) George Gimler and Cesar Boisselier, bat boys; Joe Kautz, Chip Harries, Brian Kiser, Trey Gimler, Joel Marr, Orlando Zubia, Carlos Boisselier

and Teddy Goldean, bat boy; (second row, from left) Hank Powell, Louie Zubia, Eli Eastman, Willie Kautz, Fernie Salcido, Speedy Gonzalez, David Martinez, Paul Goldean, and John Peterson. Coaches included (from left) Bob Kautz and Jim Gimler shown with sponsor Ralph Banner.



THE HEISMAN Trophy for 1989 is already spoken for, thank you. Bobby Cortez, 9, (right) led the Eastwood Raiders to the 1976 Minor Division Football City Championship with a 14-0-1 record by scoring 25 touchdowns and five extra points. (He was also captain of the defensive unit that allowed only 24 points in 15 games). His brother, Rudy, too young at age 7 to participate, was equipment manager. They are the sons of Robert Cortez, senior programmer, Corporate Systems Development Department



TWO JAL High School seniors, Judy Woods and Dianna Hogg, came up winners recently in the District "Make-It-Yourself With Wool" Contest. Judy (right), the daughter of Mr. and Mrs. Don L. Woods, won first runner up. Dianna, daughter of Mr. and Mrs. Carl D. Hogg, won second alternate. Don works as a welder and Carl in measurement at Jal.



GEORGE WINKLEY; Permian Division; Santa Rosa Plant; December 1976/32 years.

IN MEMORIAM

MIRAL D. BOND; November 3, 1976; 24 Years' Service; San Juan Division; E/M San Juan River Plant.

E. L. BOSTICK (Retired); November 24, 1976; Permian Division; Jal No. 3 Plant.

ROBERT E. HOLT JR. (Retired); October 23, 1976; Permian Division; Measurement; Spraberry.

JOHN V. KNIGHT; November 22, 1976; Permian Division; Engineering; Jal.

CECIL McLEOD (Retired); November 30, 1976; Southern Division; Guadalupe Station.

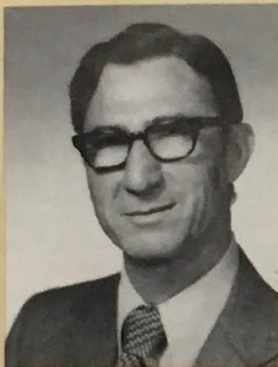
W. E. MITCHELL; November 29, 1976; Southern Division; El Paso Mainline District.

MYRTLE A. STOWE (Retired); November 16, 1976; Administrative Services/Office Services/PBX; Main Office.

MOVING UP

All promotions mentioned in this section represent only those employees upgraded from non-exempt to exempt positions.

4



(1) RICHARD W. CASTER has been promoted from accountant to senior accountant in the General Accounting Division of the Controller's Department. He started with El Paso in 1969 as a clerk in the same department.

5



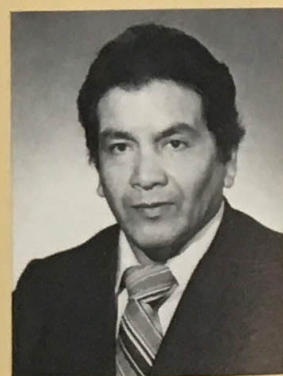
(4) IRA C. GRIFFITH has been promoted from clerk in the San Juan Division Accounting Department to supervisor in the same department. He began as a clerk in Pipeline Construction in 1952.

6



(5) PATSY A. LESLEY has been promoted from clerk to office services supervisor for the El Paso LNG Company. She joined El Paso in 1973 as a clerk in the Personnel Administration Department.

7



(6) NANCY L. MORRISON has been promoted from clerk to contract and settlement analyst in the Proration Department. She began work as a clerk-steno in the same department in 1968.

8



(7) ALVINO MUNOZ has been promoted from technician in the Office Equipment section of the General Office Services Department to section warehouse supervisor in the same department. He joined El Paso as a junior clerk in 1962 in the Administrative Services Department.

(8) THOMAS J. WILSON has been promoted from junior analyst in the San Juan Division Personnel Administration Department to personnel representative in the same department. He began his career with the Company as a laborer at Blanco Plant in 1965.

2

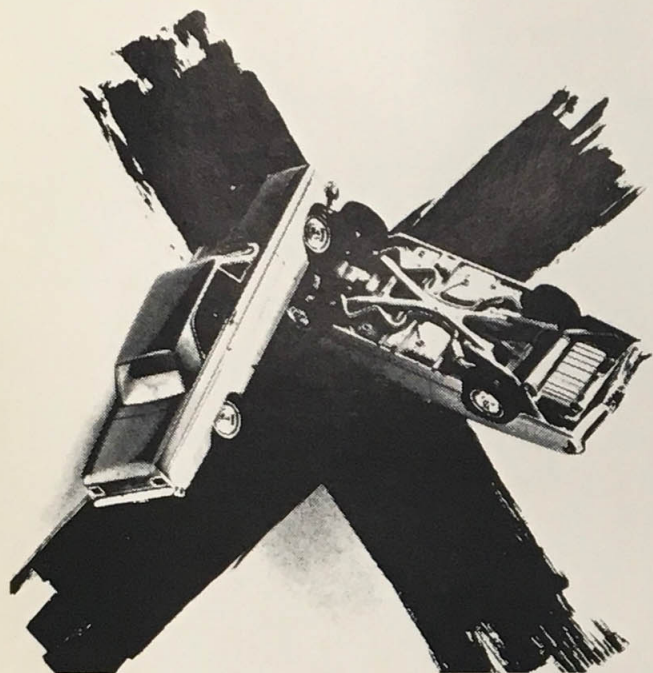


(2) MARIAN B. DAVIS has been promoted from clerk to rental analyst in the Energy Resource Development section of the Land Department. She began with the Company in 1960 as a stenographer in Advertising and Publicity.

3



(3) ROBERT F. GOODDING has been promoted from clerk to supervisor in the San Juan Division's Budget and Cost Control Department. He joined El Paso in 1956 as a clerk in the same department.



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OBSCENE PROFITS?

Out of the total income arising from corporate operations in 1974, more than 84 percent was paid out to compensate employees. The share paid to stockholders in the form of dividends was approximately one-twentieth of the total. According to the United States Department of Commerce, Survey of Current Business, April, 1975, distribution of income originating in American corporate business was as follows:

1974

	Billions of Dollars	Percent of Total
Compensation of employees*	\$524.1	84.1%
Net interest	3.2	0.5
Corporate profits		
Profits before tax	130.8	21.0
Tax liability	55.7	8.9
Profits after tax	75.1	12.1
Dividends	33.4	5.4
Retained profits	41.8	6.7
Inventory valuation adjustment**	-35.1	-5.6
Total income originating in corporate business	623.0	100.0%

*Wages and fringe benefits

**Adjustment applied by Commerce Department to eliminate inventory profits.

WHO SAID OBSCENE?

Supplier Magazines (The Pipeliner, Parhandie Magazine, Sharp Bits) 1968/1976-1977

